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Journal of the Royal Society of Arts

NO. 5027 OCTOBER 1958 VOL. CVI

TWO ROYAL OCCASIONS

The Queen has graciously consented to receive the Chairman and Members of Council at Buckingham Palace on Thursday, 6th November, when Her Majesty will accept, from the President of the Society, the Albert Medal for 1958. As announced in the July issue of the *Journal*, the medal was awarded to the Queen 'to mark Her Majesty's personal service to arts, manufactures and commerce, at home and abroad'.

On Tuesday, 11th November, the President will pay a visit to the Society's House, when His Royal Highness will inspect the newly-furnished extension premises and take luncheon with the Council in the new Council Chamber.

OPENING MEETING OF THE 205TH SESSION

The Opening Meeting of the 205th Session will take place at 2.30 p.m. on Wednesday, 5th November. The Inaugural Address, entitled *The Future of the Royal Society of Arts*, will be delivered by Sir Alfred Bossom, Bt., LL.D., F.R.I.B.A., J.P., M.P., Chairman of Council.

After his address the Chairman will present silver medals for papers read during the last session, and other awards. At the conclusion of these proceedings, tea will be served in the Library. It is hoped that Fellows will take this opportunity of meeting the Chairman and Members of Council.

CHAIRMAN OF COUNCIL IN NORTH AMERICA

Sir Alfred Bossom, Bt., the Chairman of Council, paid a visit to North America in August and September, in the course of which he had opportunities of meeting a number of Fellows of the Society, although, owing to the vacation season, many were unfortunately out of town at the time. His itinerary included New York, Toronto, Ottawa and Philadelphia, and in the latter city Sir Alfred spent some time with the authorities of the Franklin Institute, with which body the Society shares a close interest in the life and achievements of Benjamin Franklin.

SECRETARY'S ITINERARY IN THE UNITED STATES AND CANADA

Owing to unforeseen circumstances, including the important events announced in the first Notice above, a few modifications have had to be made in the provisional programme (published in the September issue of the *Journal*) of the visit which the Secretary and Mrs. Luckhurst are making to Canada and the United States. The itinerary has now been rearranged as follows:

27th–30th	September	New York
1st	October	Philadelphia
2nd–5th	,,	Washington
8th–10th	,,	Toronto
12th–13th	,,	Victoria
14th	,,	Vancouver
16th	,,	Edmonton
20th–22nd	,,	Toronto and London (Ontario)
23rd	,,	Ottawa
24th–26th	,,	Montreal
28th	,,	New York

Correspondence for Dr. Luckhurst may be addressed to him c/o one of the Honorary Corresponding Members of the Society, or c/o J. P. Anderson, Esquire, C.B.E., 19 Old Forest Hill Road, Toronto, Ontario.

DEATH OF SIR STEPHEN TALLENTS

It is with deep regret that we record the death, on 11th September at the age of 73, of Sir Stephen Tallents, K.C.M.G., C.B., C.B.E. He was elected a Fellow of the Society in 1948 and had been a Member of its Council since 1953.

Stephen George Tallents was educated at Harrow, Balliol College, Oxford, and the University of Grenoble. In 1909 he entered the Board of Trade, where he did valuable work as an assistant to Sir William Beveridge and Sir Hubert Llewellyn Smith in the establishment of labour exchanges. Badly wounded whilst serving with the Irish Guards in the early part of the First World War, he returned to Government service in Whitehall after his recovery in 1915. He became Chief British Delegate for the Relief and Supply of Poland in 1919, and in the following year, whilst British Commissioner for the Baltic Provinces, was for a very brief—but noticeably effective—period Governor of Riga. From 1921–2 he was Private Secretary to the Lord-Lieutenant of Ireland, and from 1922–6 Imperial Secretary, Northern Ireland.

Though his performance of these various and exacting duties was conspicuously able, and recognized by his appointments as C.B. and C.B.E., it was in the post of Secretary to the Empire Marketing Board from 1926–33 that Tallents first really found the opportunity, and the room, to exercise his remarkable flair for public relations and the arts of display. His conception of publicity went far beyond the merely necessitous. He was one of the first men in public service to realize the positive influence of advertising—or in his own word, 'projection'—as an instrument of official policy, and to develop its creative possibilities. Quite apart from the stimulus given to interest in Imperial trade, two mediums in particular benefited from Tallents' discriminating patronage in these years: poster advertising and the documentary film. He gave an authoritative account of the birth and growth of the latter in his Cobb Lecture to the Society in 1946, when his former Chief, L. S. Amery, took the Chair and paid warm tribute to him.

After the demise of the Empire Marketing Board, Tallents was appointed to the Post Office, and in 1935 his outstanding work there as Public Relations Officer gained him an award much coveted in the advertising world—the Cup of the Publicity Club of London. He was the first Civil Servant to receive this award. From the Post Office he moved to the B.B.C., in a similar capacity. His last years in the public service were spent at the Ministry of Town and Country Planning. After his retirement he became the first President (1947–9) of the Institute of Public Relations. From 1955–6 he was President of the Design and Industries Association.

Sir Stephen was a gifted writer and speaker. The paper which he read to the Society in 1956 on 'Advertising and Public Relations To-day' perfectly exemplifies his aptness in graceful persuasion. But he revealed most of himself—imagination, sensibility and humour—when observing and reflecting upon aspects of English country life. He was deeply attached to his beautiful and historic home at St. John's Jerusalem, Sutton-at-Hone, Kent, which with great generosity he gave into the keeping of the National Trust in 1947. Appropriately, his last major service to this Society was as Chairman of the Committee which organized the two Conferences on 'Perils and Prospects in Town and Country'.

Sir Ernest Goodale writes:

When Sir Stephen joined the Council of the Society he at once endeared himself to his fellow members. He had a natural diffidence or shyness which so often caused him to remain silent until asked for his opinion on the matter under discussion. His reply, given from such a wide experience, nearly always contributed something important. As a member of the Bursaries Board, and Chairman of its Jewellery Section, he demonstrated his great interest in the promotion of good advertising and of good design (he was an Honorary Fellow of the Society of Industrial Artists), and his wide appreciation of Art; and his skill as an administrator enabled the Council also to call on his services, which he always gave so willingly, to Chair a special Committee or organize a one-day Conference. The Council knew such work would always be done with a quiet

but assured confidence which brought success to each such endeavour. His charming personality and outstanding ability will long be missed by his colleagues.

CHRISTMAS CARD FOR 1958

It is hoped to fulfil orders for the Society's Christmas Card at the end of this month. Fellows who intend to order and have not yet done so are asked to consider their requirements as soon as they can. An order form, together with particulars of prices, is included at the back of this issue of the *Journal*.

INDUSTRIAL ART BURSARIES EXHIBITION

The Exhibition of winning and commended designs submitted in the 1957 Industrial Art Bursaries Competition is now on view at the Manchester Regional College of Art, and remains there until 3rd October. From 13th–28th October the Exhibition will be shown at the Stoke-on-Trent College of Art, Queen Street, Burslem, Stoke-on-Trent.

APPRENTICESHIP

A CONFERENCE

convened by the Royal Society of Arts to discuss the Report, made by a Sub-Committee of the National Joint Advisory Council to the Minister of Labour and National Service, entitled Training for Skill; *held at the Society's House on the morning and afternoon of Wednesday, 9th July, 1958*

First Session

Craft Apprenticeship in the Smaller Firm — Pages 814-40

Second Session

Opportunities for Closer Co-operation between Industry and Education in Apprenticeship Training — 840-58

List of Organizations taking part in the Conference — 859

THE MORNING

RECEPTION AND OPENING

The delegates were received by Sir Alfred Bossom, Bt., LL.D., F.R.I.B.A., J.P., M.P., Chairman of Council of the Society, and Sir Harold Saunders, F.C.G.I., B.Sc. (Eng.), Chairman of the Conference Committee. The Rt. Honble. Lord Nathan, P.C., T.D., D.L., J.P., F.S.A., a Member of Council of the Society and President of the Association of Technical Institutions, took the Chair.

THE CHAIRMAN: I am very glad to see assembled here so large a gathering for this conference on a matter of real and immediate national importance. During the last fortnight I have myself been engaged on a somewhat similar conference elsewhere: the Annual General Meeting and Conference of the Association of Technical Institutions, of which I am this year President, in Bath. To have presided within so short a time at two meetings of experts upon this grave subject (in which I have no particular claims to be expert) is a great privilege. It is not, however, as President of the Association of Technical Institutions that I am occupying the Chair to-day, but as a Member of Council of the Royal Society of Arts and as their representative. The building in which you are assembled is remarkable in more than one respect: partly because it emerged from the skilled hands of the Brothers Adam, the most famous architects of their Age, partly because it was built by the Brothers Adam for the Royal Society of Arts, and partly—indeed, perhaps mostly—because it is unique as a building designed by the Brothers Adam for a particular occupant which, more than two hundred years later, is still in possession. This is a tribute at once to the stability of the building and the stability of the Royal Society of Arts.

To-day we are to consider a problem which certainly existed before either this building or this Society. It has been a current problem in this country, and especially in London, for centuries. We have had the report of a Committee presided over by

Mr. Robert Carr, M.P., lately Parliamentary Secretary to the Ministry of Labour, whom I welcome here, and whose name has become identified with the problem which brings us together and on which he is to be the first to speak.

When I was preparing my Inaugural Address to the Association of Technical Institutes I was in a quandary. The meeting was arranged for a date in February and I did not know whether it was going to be held before or after this Report had been published. I was waiting attentively upon it, and Mr. Carr may be interested to know that after my speech had been prepared, and was ready for circulation, on the very day before the meeting at which I was to deliver it his Report was issued. I bear him a grudge for that, because at the last moment it was necessary to recast the speech! You know what tedious work it is, preparing a set speech for an audience of experts when one is one's self an amateur, but I am glad to say to Mr. Carr that I did not find very much to change. I did not find there was very much difference between the views expressed in the Report and those which I had expressed in anticipation of it.

The programme to-day begins with an address, by Mr. Robert Carr, and that will be followed by contributions from Mr. Robbins, Managing Director of Industrial Administration Ltd., on Group Apprenticeship Schemes, by Mr. G. A. Green, Personnel Officer of the Birmingham Aluminium Casting (1903) Company Ltd., on Joint Training Centres, by Mr. Howard, Headmaster of Forest Hill School, on Pre-apprenticeship Courses at Technical Colleges, by Mr. A. C. Kelsall, Head of the Mechanical Engineering Department of the Croydon Technical College, on Block Release Schemes and then by Mr. E. Fletcher, Secretary of the Production Department of the Trades Union Congress, on the Trade Union Point of View.

I now have pleasure in calling on Mr. Robert Carr, M.P.

FIRST SESSION:

CRAFT APPRENTICESHIP IN THE SMALLER FIRM

Opening Address

BY ROBERT CARR, M.P.,

formerly Parliamentary Secretary to the Ministry of Labour, and Chairman of the Sub-Committee responsible for the Report, Training for Skill

Lord Nathan, you have evidently learnt the moral of the story which Anthony Eden (whom I served as Parliamentary Private Secretary for four years) was very quick to teach me. When I had been with him for only a week or so he told me a story about the young Member of Parliament who was very nervous about addressing the House of Commons—so nervous, indeed, that he could never bring himself to do it. Until one day he did at least pluck up courage to ask the late Arthur Balfour how he could overcome his nervousness. Arthur Balfour replied, 'Young man, speak often, speak at length, and you will soon enjoy that contempt for your audience which only a bore can command'. I thought I had another quarter of an hour to compose my thoughts, and here I am put in to bat!

I am delighted to be here to-day. When I was first asked to come I was

Parliamentary Secretary to the Ministry of Labour; it was, of course, in that capacity that I presided over the Committee with whose report my name is associated. The first thing I want to emphasize is that in that Committee, in that Report, we had substantially the views not of Ministers, politicians, and civil servants, but of representatives of both sides of industry. Apart from myself as Chairman, all the members of my Committee were either representatives of employers or trade unions. So it was a committee composed of people who knew something about the subject in hand and were talking from practical experience. When I read some of the criticisms of our Report I could have wished sometimes that practical experience was imbued in the pens of some of the critics! Now that I am no longer Parliamentary Secretary, and therefore not liable to have everything I say recorded and questioned in the House of Commons, I feel slightly less responsible than I did, and able to be a bit more controversial on certain subjects. I will not over-indulge that feeling, however, because I see in the audience some of my old friends from the Ministry of Labour who were for two and a half years custodians of my discretion, and I will try not to say anything which will shock them to-day.

I have no doubt at all about one thing which I learnt while at the Ministry of Labour, that is the shortage of skilled workers from which we suffer in this country to-day. Over and over again our Ministry figures proved to me that even in those areas of the country where there was an employment problem—and I am talking now of two years ago—vacancies were far in excess of the number of people wanting jobs. And even in those days our Ministry of Labour Offices, as far as I know, invariably had vacancies for skilled men and women which they could not fill because the skilled workers were not available. On the other hand there was a surplus of unskilled workers for whom they had no vacancies. I am sure that there can be no doubt at all about the present shortage of skilled workers throughout our country and I am sure that is a drag on our industrial development. When my Committee received evidence, although industry were not able to quantify either their present position in relation to skilled manpower or their future demands, they were of one mind in saying that their demand for skilled workers was going to increase, certainly not to decrease, and I am sure that those views are not affected by the fact that there is a temporary de-acceleration in the economy at the moment. Indeed I believe that one of the things we have got to keep in mind is that this temporary slowing down in the rate of acceleration of our economy does not in any way mean that the demand for skilled workers is going to be less in the future than we thought it was going to be when my Committee started examining this subject over two years ago.

And so on the one hand we have the need of the national economy for more skilled people. The other side of the need comprises the increasing number of young people leaving school and wanting progressive jobs in industry. Fortunately those two needs are complementary. What industry has got to realize is that we have very little time to spare because this bulge (as it is so clumsily called) of young people is upon us. By 1962 the peak will have been reached, and so, unless industry is able to take advantage of the increasing

numbers of young people looking for jobs in the next year or two, not only are the young people concerned going to miss the opportunities they ought to have for progressive training and employment in industry, but industry and the national economy as a whole is going to miss perhaps the only opportunity it will have for a good many years to make good the present chronic shortage of skilled workers. The urgent need in the next two years is to provide more training places in industry for these young people. Some firms, particularly some of the larger ones, are already training their full complement of apprentices. We have got to face the fact that the projected ending of National Service—which will result in the fact that some of the apprentices they are training will not be taken away from them and for a couple of years they will have a bulge of a different cause within their works—may make it difficult in this transition period for the firms who already have large training programmes to maintain their present intake of apprentices, let alone increase it. And that means that if the number of apprenticeships in this country is to be increased it is necessary for many firms which have not done so previously on any substantial scale to take up training. In general, of course, that means that the medium-sized and small firms have got to do more than they have been doing, because on the whole they have not been training their share of the national supply of apprentices. It is for this reason, Sir, that when I saw that your conference was to be particularly concerned with the problem of the small firm I felt that this would be one of the most important conferences which had been held since the publication of my Committee's Report.

The importance of the small firms I suppose is best illustrated by the figure which we tend to forget in this country, namely that 90 per cent of all establishments in manufacturing industry employ less than fifty employees. It is of course true that, although only 2 per cent of firms have a thousand or more employees, this 2 per cent nevertheless does employ something more than a quarter of all the workers in the manufacturing industry in this country. But even so, it still leaves nearly three-quarters of the industrial working population in the medium and small firms; and so it is only to the small firms that we can look for this increase in apprenticeship training.

It is sometimes rather too easily believed, not only by industry but by parents and the boys themselves, that most of the advantages in training lie with the big firm. I am not at all sure that that is a sound view. All the advantages of training do not lie with the large firm. It is obvious that a large firm can provide certain facilities which no small firm can hope to offer. On the other hand, the small firm can provide the personal touch and guidance of the young people which is almost impossible in the larger firms. Although some small firms are specialized, many more are not and you have only got to consider the jobbing engineering works to realize that the apprentice in a good firm of that kind can get a much wider range of experience than he might get in a very large firm. And the small firm can, and often does, offer the apprentice himself much more scope for initiative than can be found in the larger firm. Equally, of course, one cannot deny that the small firm has peculiar difficulties when it comes to organized

training. Some find it difficult to give the whole range of training required. Others cannot carry the staff required for the giving and the supervising of good quality training. Others again find day-release expensive and, in relation to the total numbers they employ, that the absence on one day a week of one or two younger people is unduly upsetting to the planning of their work. But it is those difficulties which I have just mentioned that I think should indicate where we ought to look for ways in which the small firm can be helped to increase the number of apprentices which it trains. I am only going to touch on these points quickly because other speakers are going to deal with each one in detail.

First of all there is this question of group apprenticeship. Having seen one such scheme in action I am in no doubt at all of the big potential which exists for helping small firms in their apprenticeship training by this group apprenticeship method. It ensures a wider range of experience for the apprentice, and that wider range involves not only the actual syllabus of training, but also seeing different sorts of work done in different establishments, under different management; and I think the apprentice who has served a period in four or five of these firms is more widely experienced at the end than one who has spent the whole of his five years in one firm only. But group apprenticeship does not only provide that experience: it also helps to give what the small firm finds most diflcult to provide; a supervisor of the scheme, one instructor, one guide, both to the management and the apprentices throughout their course, a specialized person whose one interest it is.

Then there is the question of joint training centres. Almost exactly a year ago my Committee was in Germany seeing what the Germans were doing in this field, and one of the things which impressed us was at Solingen, the German Sheffield, where we visited an apprentice school which had been set up by the industry of Solingen on a co-operative basis. The firms in the Solingen district had jointly contributed to the cost of setting up this apprentice school, which is concerned with the first year of apprenticeship. I had no doubt that this was the sort of institution which was doing most excellent work and assuring in that important first year that apprentices were led into the right places for their skills and given the right outlook on the work which lay ahead of them. If firms in Western Germany can do that, then so can firms in Britain. I refuse to believe that British firms have not got equal foresight, equal energy and initiative, to copy that example.

Then there is the idea of pre-apprenticeship courses at technical colleges, provided that they can be developed so that that year at a technical college for pre-apprenticeship course can be regarded as an initial period of apprenticeship and can count towards the total apprenticeship time. Some pre-apprenticeship courses are being developed; I think Scotland is their main home, although I believe they also exist in one or two places south of the Border as well. And then there is the question of block release. I said earlier that one of the difficulties of the small firm is often how to spare this one day a week. I think it would sometimes be easier for the small firm to organize its affairs if instead of this one day every week, it could gear itself to spare apprentices for, if necessary,

two or three months in all, and then have them back whole time; thus by interchange of apprentices on block release they can find it easier to plan their work than if they have boys disappearing for odd days every week, year in year out.

There is one other point which has been raised in connection particularly with the small firm, and that is whether the government of this country ought not to set up apprenticeship centres on the French model. That point was considered by my Committee and referred to in our Report. We said 'No' in answer to the question whether this should be done, not because we want to run down apprenticeship centres, but mainly at this time because of the conflicting demands on capital development in this country—for example, the need for expanding facilities for technical education—and also because of the time it would take to develop a new system of this kind. Let us look at both of them. The government at the moment is embarked on a big extension programme in technical education, and you also know of the tremendous needs of other educational establishments, schools, universities, colleges of all kinds. I do not believe we should be wise to add to the list this new idea of an apprenticeship centre, because all we should be doing would be getting less and less of more and more and I do not think it would be the answer in these present circumstances. Quite apart from the physical resources, it would be a new concept for both employers and trainees in this country. Although it might be accepted in time, I think that drastic change at a moment of urgency such as this can delay rather than expedite the training that we must undertake, and so my Committee, while recognizing the merit of the French system, says that it is impracticable in this country in view of the urgency of tackling this task in the next few years.

Now I come to the action which should be taken in order to do some of these things which are necessary to help small firms. I have no doubt in my mind that the lead has got to come, and can only come, from the employers; it cannot come from the government, or from the trade unions (though they have both got a part to play, and I will say something about that in a moment). If the employers do not take the initiative in wanting to train, then nobody can do it for them. This is like taking the horse to water and not being able to make him drink. Industry has got to want to train, and has got to make its plans for training; and when it has done that then we need all the help we can get from trade unions and government. But in the first place this initiative must come from the employers and employers' associations. When I say employers' associations I mean all of them. There is no room at this moment in this subject for any demarcation between one employers' association and another. The British Employers Confederation and their members have a part to play. The F.B.I. and the trade associations and every organization of employers have their part to play, and I for one have no patience whatever for any holding back or going backwards or forwards, or saying, 'You keep off, this is my job'. This is the job of all of us, and we can all do it without getting in each other's way in the process. But how have employers' associations of all kinds got to do this? Partly by education and persuasion of their members, and this is I believe where the ordinary trade association is so important. In my experience in industry the medium and

the smaller firm is usually—not always—remote from the activities of its actual employers' organization—by that I mean the body federated to the British Employers' Confederation. The smaller firm is more likely to be closely associated with its own trade association, covering its particular bit of industry, and therefore is more likely to listen to information and guidance handed out by its particular trade association. That is where I believe they have got to be brought into this leadership. These associations have got to provide common services that the smaller firms are not likely to provide for themselves, to take the initiative in establishing and subsequently running group apprenticeship schemes. It simply is not good enough to go round the district asking firms if they want such a scheme. Of course the answer is likely to be either 'No' or at least apathetic. That is not leadership. Leadership in this field means that the association in each area has got to go round persuading its members, and smaller firms particularly, of the necessity of doing this and saying, 'Here is a necessity and here are the means which we are providing to help you to do it'. That is leadership. Then, similarly, I think employers' associations have got to take the initiative in establishing and subsequently running joint training centres of the sort I have mentioned, that I saw at Solingen in Germany, and also to give the lead in trying to encourage every firm in their section of industry if it cannot train itself at least to contribute to some fund for the cost of that training. Lord Nathan, I have spoken rather strongly about the rôle of employers' associations. I feel I can do that now because though while I was Chairman of this Committee I was merely preaching, I am back in industry now and have got to do some practising. So I feel I am no longer, as it were, in the pulpit telling other people what they ought to do. I shall be taken to task if I do not do something about it. When I went back as Chairman of the company with which I had formerly worked for many years, the very first letter I received was from a certain Mr. Johnson now retired and living in Devon. He wrote to tell me about his experiences as an apprentice of my company over fifty years ago, when we were very small indeed, and it encouraged me to know that at least we had a tradition to work on in my own company. Once the employers have given the lead then we have got to look to other people, the trade unions for example, to do their part, in explaining things to their members and encouraging them to accept training where it is necessary. I hope that the trade union leaders will bear in mind what I said in the beginning about the Ministry of Labour statistics, and if there are fears among their members at the moment about the temporary slowing up of the economy to which I referred, that must not make them hold back on training, because the figures show that if only we had more trained people at the moment the total of unemployment would be lower, because the bigger the proportion of the trained working population of this country, the easier it will be to maintain a high level of employment.

And then there is also the question of action by the government. My Committee undoubtedly considered that the process of training was mainly the responsibility of industry, but tied closely to training is education, which is clearly the responsibility of government; and we had no doubt that for the next

few years at least to leave training as the responsibility of industry and education as the responsibility of the government was the best way of making quick progress. The one thing my Committee were insistent on was the need for much closer co-operation between the worlds of industry and education. There can be no doubt, judging from the reactions to the Committee's Report, that although this co-operation between industry and education may be excellent in some places it does not at present exist nearly as fully and as widely as it ought. The willingness of the small employer to accept day release or block release will be very much affected by what he thinks of the relevance of the training given in the local technical college, the relevance of that training to the ability of his apprentices and the needs of his firm in industry; and it is up to all of us who have any influence in education to see not only that the courses are *run* soundly, but to take more steps to persuade the employers of that fact. They have to be relevant and they have to be seen to be relevant.

One other point which I think is extremely important. It is not only necessary to increase the quantity of training, but also necessary to increase its quality. Here my Committee were in no doubt at all about the importance of instructing those people in industry who in turn have to train the apprentices. A few people may have the natural gift for teaching—I do not think many people have, and, even those who have it can teach better if they have been given some elementary instruction in the technique. So there is some need to train the trainers. Now the Ministry of Labour has its Staff Training College at Letchworth mainly, of course, to train its own staff for government training centres. At that Staff Training College the Ministry has been able to train a number of instructors for different industries. If we can train any more I know the Minister will be glad to do so, and at least the Centre will be there to help and advise industries about this business, based on its own experience.

Recently there was a most excellent article in the centre page of *The Times* on this subject, with particular reference to the smaller firm. I disagreed with the article, however, in respect of one criticism it made of my Committee's Report, namely that my Committee ought to have recommended the government to assume more direct responsibility for taking steps to raise the number of apprentices, and in particular in helping the small firm. The article was not very specific as to how that help should be given. I am no longer a Minister and therefore I cannot in any way make any statement of government policy, but from my past experience and position I would just say this (in fact I have already said the first part of this): I believe that the initiative in taking on more apprentices must come from industry itself. I do not think that the first steps can be effectively undertaken by the government, but in reply to what was said in *The Times* I would observe that if industry gets down to its plans and then finds difficulty in implementing them, I believe government ought to, and I believe it would be prepared to, examine sympathetically any suggestions put forward by industry as to how it could help industries to help themselves in this matter. But I do not think that the first initiative can come from the government.

My Committee, however, felt very strongly that there was a need for some

new body to provide a stimulus for this leadership, and so they recommended the establishment of what it provisionally called a National Apprenticeship Council. I believe that is under consideration by both sides of industry at the moment, and I hope very much that shortly it will be announced that such a Council is to be set up, because there is a need for a national body at that level to act as a focus of progressive thinking on this subject, to act as a source of information to industries, and as a stimulus and source of assistance to individual industries in solving their particular problems.

I am in some danger of copying the young Member of Parliament I mentioned when I began. The trouble about this subject, particularly when one has been absorbed in it for several years, is not to know where to begin but to know where to stop, and know what not to deal with. Clearly there are dozens of other aspects of this subject which I could talk about. If I have talked at length it is only because I am utterly convinced of the necessity of succeeding, both in the interest of this country's economy and the interest of the boys and girls themselves. We hear a great deal these days about juvenile crime and the failures of our younger people. There are no doubt many causes. I wonder whether our passion nowadays for collecting statistics makes us think that we are all bad in this generation, and that our predecessors were all good merely because we did not then record these things. There are undoubtedly social tensions and problems which give rise to the sort of failure which we all deplore. They arise from physical living conditions at home, perhaps from the disturbances of the war, but principally I think from the circumstances of urban and industrial life as it has developed in this country. You are not going to get responsible satisfied citizens, either young or old—citizens who will use instead of abuse their leisure—unless you first give people some cause for satisfaction in their work apart from its material rewards. There are many ways in which this problem can be tackled, and I believe that training is one of them. If you give boys or girls training, even if it is not a full five-year apprentice training, even if it is comparatively short, I believe that one result will be to give them some sense of pride and purpose in their work. This subject then is also important for its bearing on some of our social tensions and evils. So for all those reasons I have given it is worth while to be here to-day. I only pray that this conference will have some practical success—as I am sure it will.

THE CHAIRMAN: I think you will agree that although Mr. Carr has left the front bench for a time, he has not lost his front bench skill. There will be an opportunity later of discussing what he has said. I now call upon Mr. Robbins to speak on Group Apprenticeship Schemes.

GROUP APPRENTICESHIP SCHEMES

MR. E. L. G. ROBBINS (Managing Director, Industrial Administration (R. & A.) Ltd.): First I must thank Mr. Robert Carr for the extremely able way in which he dealt with a number of points which I had intended to deal with, and for thereby saving me a lot of time, because he has done it very much better than I could hope to do. I should like to give you a very brief description of the group

apprenticeship scheme which we operate on behalf of the Engineering Industries Association, a trade association with a membership of some 4,000 engineering firms, mainly small companies.

In 1954, when their West London Committee had been debating how they could start a group apprenticeship in their locality, they asked us, as industrial consultants, to report on the way in which we thought this could best be organized and operated. As a result we were asked to operate a pilot group on the lines which we recommended in our report. The minor difficulties which had prevented the local committee from taking action themselves, problems about rates of pay, organizing transfers and so on, in practice we found were far less difficult than had been anticipated, and the pilot group was a great success. It grew to a larger size and covered a wide area and, in consequence, had to be split into two groups. As a result, since 1954 there has been a development of new groups in other districts, and we now have seven groups in the home counties, five in the Midlands and one in the North-West, with a total membership of 180 firms and about 280 apprentices. It is still small, but the principle is being accepted.

We started with craft apprenticeship and we now offer craft, technician, student and graduate, and there are some of each. The way the scheme operates is that we provide an apprentice supervisor in a district in almost exactly the same way that a larger firm employs an apprentice supervisor. We transfer the apprentices within the group of firms in order that they shall get wide experience, just in the same way as they would move between departments in a large firm. We help with the selection of boys, prepare training programmes, co-operate with the technical colleges on the courses the boys should take, look after the reports, see the parents, provide training aids and so on, in exactly the same way as the training staff in a large firm would.

The local organization is that each of the member firms in a district is a member of a group committee which controls local policy, and we co-opt to that committee the Y.O.E.s and educational people in the district. Liaison with the trade unions is obtained through the established procedure of the local training committees, to which one member of the group committee is co-opted.

The advantages of the scheme from the boy's point of view are firstly that he is trained in his own district and he does not have to leave home to go to a big firm. In addition, he derives the educational value, to which Mr. Robert Carr has already referred, of the broadening of his experience by working for three or four separate managements. In the small firm the managing director takes a personal interest in his apprentices; and the skilled craftsman who is responsible for the practical training makes quite sure that the boy knows a great deal about his subject before he is transferred to the firm next door; and the boy is impressed by this personal attention, and when he goes away on transfer, he has a feeling of considerable responsibility as the representative of his sponsor firm. The social and educational value of his transfer is far greater than we ever foresaw, and the boys who have completed their training are balanced individuals as well as skilled craftsmen.

The advantages of the scheme to the firm are that it increases the amount of

kill in their locality, so that, instead of competing for a smaller number of skilled men, they are building up a greater number of craftsmen for their area. The skilled people do not very willingly change their district; they tend to stay in the area in which they were born and in which they live, so that there is a local advantage to the small firm to come into this form of training. One other factor is that the wanderlust of a boy disappears because he gets wide experience in the locality. A boy who has served his apprenticeship in one firm only does not have the advantage of the wider experience gained in working in several firms: but an E.I.A.G.A. boy, a boy who has been trained in a group of companies, has had that experience of other managements and is more likely to be content to stay with his sponsor firm where his loyalties have been developed.

What of the future of group apprenticeship? We know how great is the need for more training facilities, which we cannot reasonably hope to meet in years by means of government-sponsored training schools or any other similar alternatives. If we are going to provide this training in the short time that is required we must use the workshops that already exist in the small firms. What is stopping the small firms from doing more is the responsibility they undertake in indenturing an apprentice. They give him a five-year contract—frequently a better contract than that of the managing director!—and they are naturally reluctant to take the responsibility for so long-term a contract. The other factor is the cost. Converting boy labour into apprentice training means that we are going to take apprentices away from their jobs for one day a week. A small firm has not much money to spare, and it needs the boys' contribution on production: if the boys are absent one day a week, it means that production suffers.

Mr. Carr said employers must use initiative, but I think we could help more by providing a little incentive. Perhaps we could offer some form of compensation to the small firm for the day on which the boy is not working: this would not be anything like as costly for the taxpayer as would be the building of training schools or any other alternative. We do not want government direction, which is the negative way of meeting the situation; but if the Chancellor would provide a positive incentive in the form of tax relief for the day the boy is at technical college, I think we might look forward to much more co-operation and many more apprentices being taken on by the smaller firms.

JOINT TRAINING CENTRES

MR. G. A. GREEN (Personnel Officer, Birmingham Aluminium Casting (1903) Co., Ltd.): For the next few minutes I am going to talk about the joint training centres. I propose to do this by outlining the work of two establishments which come into this category and which show how the foundry industry has already tackled this aspect of training. The first is the National Foundry Craft Training Centre, a training establishment set up by the foundry industry with special attention to the needs of the smaller firm. The object of the centre is (*a*) to teach boys the basic skills of the craft trade of moulding and coremaking and (*b*) to supplement that training with an appreciation of, and instruction in, the technical aspects of foundrywork. Throughout the training the emphasis is on practical

work. In setting the objective the industry has in mind that the training should be complementary to the work done by the trainee at his normal place of employment, but also have regard to the fact that as the foundries, like most industries, tend to become more and more specialized, so the training is designed to broaden the experience of the trainee by providing instruction in a variety of methods and metals. The course covers sixteen weeks, which is divided into four periods, each of four weeks. The interval between these periods is about ten months, so that the training spans the normal apprenticeship, and the work done at the centre is geared to the overall progress of the apprentice in his particular trade. At the beginning of each period the instructor appraises the knowledge of each boy and grades him accordingly. The syllabus enables each boy to be treated as an individual, and he is encouraged to improve on his own previous best. He is not asked to compete against other trainees or to prepare himself for any specific trade test. The practical and technical work done at this centre is recognized by most of the technical colleges, and you will agree that that is very necessary. Therefore the work the boy does can be credited to his college record and it does not prejudice his progress at the college. The centre is a small one and has a capacity for fourteen trainees, of whom twelve reside at the hostel. It is a non-profit-making organization controlled by a Board of Trustees and a Management Committee. Each member of this Board of Trustees and Management Committee is a senior executive in the industry and he is fully conversant with the skills required and the future development of the trade. At the end of the course, subject to his having satisfied the Management Committee, the trainee is presented with a certificate which shows the work he has done; and he therefore has the knowledge that it has been worth while and will be of use to him in his future career.

My second example is from the technical side and refers to the National Foundry College started in 1948. It is a self-contained unit of the Wolverhampton and Staffordshire Technical College. It exists for the education and training of promising young men to fill technical and managerial posts in the foundry trades. The fees and other costs are well within the means of even the smallest firm. The work covers a full-time course of the post-graduate type leading to the National Foundry College Diploma. Part one lasts from four to six months and is then followed by six months for further industrial experience. Part two occupies a full academic year of about ten months. The college is controlled by a Board of Governors drawn from industry, science and education. The head of the college is a man very experienced in the techniques and needs of the trade, and it is part of his job to maintain a very close liaison with all sections of the industry, to ensure that the teaching of the college is in line with modern practice and forward thinking. All students must have had experience in the trade and be of a fairly high academic standard. The work of the college covers all aspects of the foundry industry, including metallurgy, technology for the foundry, and management, including the function of higher management. Projects play an important part in the work, and students carry these through from the blue-print to the final production. During the course visits are made to

many foundries of the United Kingdom and sometimes abroad, to provide the student with the opportunity of comparing methods, materials, etc., and in each of these visits there is a discussion with the senior management of the company to discuss the problems associated with controlling a factory. A special feature of the teaching is a series of lectures by leading men in the trade which cover all aspects of foundry life, including human relations. The college is residential and a great value is set on the communal life which allows for informal discussion.

To conclude, I would suggest that there are certain points arising out of the experience of these two centres which may be of use in the development of new joint training centres. The first of these is the need for a clearly defined objective. Secondly, the need for a controlling body of top-line management which knows the needs of the industry it serves and is mindful for its future. Thirdly, the need for an executive management which is fully conversant with the skills to be taught; and fourthly, and most important of all, the need for recognition by all concerned that the training must be in the interest of the trainees. If this is done conscientiously the benefit to the trade will follow as a matter of course.

PRE-APPRENTICESHIP COURSES AT TECHNICAL COLLEGES

MR. A. E. HOWARD (Headmaster, Forest Hill School): My subject is pre-apprenticeship training courses at technical colleges, but I want to begin in a quite provocative manner by saying that I do not believe these courses should be in technical colleges at all. I think these pre-educational courses are the problem and indeed the province of the secondary school, particularly with the new types of secondary schools which are being developed over the country as a whole. My own school, if I dare mention the name, is a comprehensive school, and because of this, is a very progressive school! We plan top-end courses very broadly in terms of future careers, which means that we have at once provided for the reality of our education, that we have provided an incentive for it, and that we hope we are providing industry with the type of people they want.

The three courses broadly speaking are as follows: the craft course, for the boy who is going to be the future City and Guilds student—the craftsman—whose value we recognize. Secondly, for the boy who is going to enter industry at roughly the technician level—your future National Certificate student. Thirdly, for the boy who is going to enter at the technology stage. What do you want for those three? I suggest first of all you want boys leaving at 16. The school leaving age is being raised whether the government is doing it or not, and I am delighted to know that this is so. The revolution is taking place, and, that being so, I am sure industry is going to gain. Fifteen is a silly age at which to leave school; the product at the age of 16 is much better, much more mature, much more responsible and much more reliable. So we plan all our courses to the age of 16. Perhaps the most difficult one to plan is the craft course: one has to be very careful to plan it the right way round. What industry wants, what the country wants, is a thinking animal. It is not our job, nor do we wish it to be our job, to produce tool-makers or tradesmen. It is our job to provide someone who has a basic education, who can think for himself, who has learned the basic

skills. Therefore when one plans a craft course for the boy who is going to be a craftsman we try to begin at the right end. We begin with English and mathematics and science, and work outwards towards the workshops and the laboratories and so on. We do not begin from the workshops and work inwards. It is so very important to have a boy who is able to speak and understand his own language and can do the necessary calculations, and who is, above all, a responsible and reliable individual.

For the lad who is going to enter at the technician level, we provide an education approximately to the standard of about four 'O' level subjects, two of which must be mathematics and physics. English, I suggest, should be one of the other two. This leads us very easily to the standard required by the future technologist. He is the fellow who should come in to industry either to take a sandwich course or to go on for further full-time education with at least two 'A' level subjects, and better still, three. Mathematics and physics are essential, and if he has applied mathematics and chemistry as well, so much the better.

I believe pre-apprenticeship courses should be part of full-time education. That extra year at school will be of immeasurable value to them, the pupils, and to industry, and much more effective than part-time education at a technical college. Let the technical colleges do the job they want to do—that is, provide the vocational courses. Let the schools deal with pre-vocational training.

I will conclude by making a plea. Mr. Carr said that we want as much co-operation from industry as possible. In my school I have a careers master who is also the head of the vocational subjects department. He spends at least as much of his time in industry and out of the school as he does in the school. In return he invites various people from the industry with which we are associated back to the school. I would welcome more of this. The more co-operation we have the better. I should like the opportunity for some of my staff who give specialist instruction to visit workshops and drawing offices and I should like some of your people to come to us. May I make one more plea? You will get a better product at the age of 16 than you will get at the age of 15. I think I ought to add one point. I know it is very nice for managing directors of firms to say they employ so many first class honours graduates in mathematics, physics, chemistry, engineering and so forth, but you know, we must have them in the schools too. When one comes to the end of the summer term and looks at one's staff for the next year, one first of all looks at the science staff, and if one has a full-sized staff there, one gets down on one's knees and prays!

BLOCK RELEASE SCHEMES

MR. A. C. KELSALL (Head of the Mechanical Engineering Department, Croydon Technical College): My contribution is a brief description of the operation of a block release scheme as applied to a craft course. The usual pattern for technical training during apprenticeship is a one-day-a-week release to the local technical college. In this way an apprentice attends college for approximately 36 days in a year. In a block release scheme the apprentice attends the college full time

for a number of weeks, a usual arrangement being a block of eight weeks. Such a block would give approximately the same time at college as one year of part-time day attendance. Three blocks would be required to cover a three-year course normally operated on a part-time day release basis. A very successful scheme with which I have been associated for several years is that operated in conjunction with the London Area Committee of the Joint Industrial Council for the Heating and Ventilating Industry. This scheme is concerned with the training of students for the City and Guilds Heating and Ventilating Operatives' examination. Normally the apprentice would attend a college one day a week for three years. In the block release scheme we operate, the student attends college for his first block of eight weeks during the autumn term, and this is during his first year of apprenticeship. At the end of this eight-week block the apprentice returns to full industrial employment, and we see him again in college in the summer term, that is about the middle of May, for another block of eight weeks full-time. His final period of block release occurs in the spring term of the following academic year. This attendance begins about February, and on the conclusion of this the student takes the City and Guilds examination. The whole of the technical training has therefore been covered within two academic years.

The scheme has proved so successful that in the London area there is no alternative avenue of training; all apprentices are released to college on the block release system, and the whole business of enrolment and college placing is handled very effectively by the London Area Committee of the J.I.C. It is a very amicable and pleasant arrangement between industry and the education authority. Experience over many years has shown that there are great advantages in the block release system. The continuous period at college enables the student (remember, they are trade apprentices) to settle down much more readily than is the case in part-time day release, particularly when he is concerned with subjects like technology and science, which, as you all appreciate, are not so acceptable, or easily comprehended at all times, by the trade apprentice. During the course about half the time at college is spent in practical work, where the student is taught the basic processes of his craft. Consequently when he returns to industry after the first block of college attendance he has a fair measure of practical skill. The acquisition of further skill when in industrial employment is made much easier for him, as he has a sound foundation on which to build his experience. The City and Guilds examination in this subject includes a comprehensive practical trade test in addition to the theoretical paper. Results show a considerably increased proportion of passes when the course is changed from part-time day release to block release.

This conference is very much concerned with the problems associated with the provision of training facilities within the small firm. The large engineering organization is usually able to maintain a works training school or possibly a training bay staffed with skilled instructors. It is quite obvious, however, that for financial reasons this kind of provision is difficult in the small firm. Block release does offer to the small firm a means of overcoming the many difficulties

associated with the provision of adequate training facilities. The experience gained with the heating and ventilating industry has been such that next session my college is commencing a pilot scheme for those apprentices taking the City and Guilds Machine Shop Engineering course, and already we find from discussion with the industry that the scheme is going to prove very attractive to the many small firms in the South London area.

THE TRADE UNION POINT OF VIEW

MR. E. FLETCHER (Secretary, Production Department, Trades Union Congress): I see in the programme that I am going to make 'a general statement' —that is not what I call it! Frankly, I am weary of general statements and I think that if we do not concentrate too much on general statements to-day we shall get to the basic objective.

The T.U.C. is generally in favour of the recommendations of the Carr Report. I do not know how it could be otherwise, since the T.U.C. participated so substantially in the drafting of the Report. The basic point is that the Report's specific recommendations are being considered by the affiliated unions at the request of the T.U.C., and are being discussed in detail industry by industry. That is right, because the training, apprenticeship or non-apprenticeship, and the joint arrangements between the unions and the employers on that score are part of the general industrial relations of the industry and have to be considered as such. There is much to concern the individual unions rather than the T.U.C., and I hope that representatives of important unions in the audience will participate in the discussion. The T.U.C. wants as a high priority more and better training. Young entrants have a right to a better selection of jobs before going into industry, to better induction procedure and to better training. They have a right to those things, and it is consistent with this that the T.U.C. and unions as a whole wish to raise the school-leaving age as soon as it is practicable. This basic social objective is one of the reasons for the T.U.C.'s interest in increasing productivity. Of course the T.U.C. wants the unions to participate in national and regional joint apprenticeship councils, and of course it recognizes the responsibility and the need for flexibility, provided these factors are discussed intimately and in detail by the individual unions, industry by industry. Mr. Carr was so right in saying that a great deal of responsibility does rest upon the employers and the employers' organizations. I know that many unions would be very interested in discussing these matters in very much more detail than they had an opportunity of doing in the past. But these factors which I have mentioned are not new—apart from 'the bulge'—and they have been talked about for years. The question is, how fast do we go from here? The question is, not whether the Carr Report has given us all the facts, but whether it is going to give us a big enough 'shot in the arm'. For years we have been very casual about this important human problem. The Carr Report mentions the lack of information and statistics even about the number of apprentices (it was the same with the Report on the Training of Supervisors; perhaps that is more understandable). But you see, it is partly a question of improved organization, and partly of more

enthusiasm to create and maintain the drive. That is why the T.U.C. has a wish to participate in an industrial training council, provided it is established in such a way that it will do a specific job and is not just a face-saving device. We must have additional enthusiasm and improved organization. What is needed is a substantial catalyst—industries and employers will have to be provoked, trade unions will have to be provoked.

I am not being cynical when I say the trade unions will have to be provoked as well as the employers—just look at the history of the group apprenticeship scheme, where the justification has been apparent for years. The T.U.C. in 1939 went on record in favour of this wider approach to apprenticeship. I do not know why there has not been ten times the impact—it may be partly due to industrial politics in this difficult engineering industry—but I take my hat off to the Engineering Industries Association, for they have both the qualities which I think are basically important—the organization, and the fire in their bellies—without which we shall never get things developed on this wider level. I speak with feeling on this, for I have spent many years in a small engineering firm, and from a training point of view it is idle to pretend that in many small firms (I am not talking about every firm) there can be adequate training without some type of group approach. Shall we be able to halt this contracting out by employers over responsibility with regard to training? It may be an apparent saving to them but it can only be at a cost to the nation.

Apprenticeship must surely therefore be regarded in two ways. It is partly a matter of industrial relations between the unions and the employers at national level, but it is also a social problem; the new relationships of young people entering industry, involving their employers, the unions, their parents and the educational authorities. There is therefore a need for industry to give more attention to the training of all young workers and not only apprentices.

In conclusion, trade unions require from industry not only full employment and rising standards but also—and I was very impressed with Mr. Carr's closing statement—satisfaction. Satisfaction partly from the job itself (and remember that people usually enjoy what they can do well) and partly from the social relationships with their workmates. We spend the greatest part of our lives at work. Trade union membership and the trade union relationship can contribute to this satisfaction, but by themselves they cannot provide all that is necessary. It is natural that the trade union movement wants to co-operate nationally and at the industrial level to improve the quantity and also the quality of training for apprentices and non-apprentices; partly for the sake of training new members and partly because we believe it is the only sound basis for an industrial democracy.

DISCUSSION

THE CHAIRMAN: When I was asked to take the Chair I was told that my principal task, at the conclusion of this opening discussion, would be to stimulate debate upon those subjects which have been elaborated before us. I thought I was going to do that at twenty-five past eleven, but Mr. Fletcher has been very restrained, and has put the trade union position in so short a time that perhaps it might be worth

while for me to open this discussion before throwing it open to the general company. If I may do that I would tell you one or two of the reflections that have occurred to me in reading and studying the Carr Report and also in listening attentively to the statements that have been made here to-day.

What strikes me most is how little change there is in outlook, and how slight is the advance in method, during the last fifty years. I have reached the age when I can look back and say what happened fifty years ago, and I will tell you what happened in this realm of apprenticeship with me in 1908. During the whole of my lifetime the number of small firms has been far greater than the number of large, and throughout, as to-day, the exception and not the rule is to have more than twenty employees. The vast mass of the industry of this country is conducted by firms with less than twenty employees. It was the case fifty years ago and it is now, and that is a very remarkable fact in itself, especially when you remember that of those who have less than twenty the greater part have no more than five.

Fifty years ago as a very young man I was responsible for running one of the largest working lads' clubs. The great problem then was what to do for them when they left school at the age of 14. We developed a widely followed system of apprenticeship to small firms. There is nothing very unusual about that, but what I think was unusual and what might perhaps be recreated was a system of what I will call guardianship. Every apprentice had a guardian. I myself was a guardian of apprentices, which meant that I took them under my wing, kept close contact with the employers, created—I hope and believe—a good relationship between the small employer and the apprentice, and saw that the apprentice had a fair deal and gave a fair deal. I found that worked very well, and I am glad to say that fifty years later I am still in contact with a number of those whom I looked after so long ago. I have no doubt at all that here was a system which worked extremely well and which might be worth reflecting upon now.

Now I am not looking after apprentices in that sort of way. My contact with industry has been long and continuous but rather superficial as far as the day to day conduct of industry is concerned. The main part of my professional life has been to prevent industrialists and men of commerce from making mistakes in various spheres of their enterprises, and to remedy the mistakes which they have made. But I am myself chairman of a company of some standing which many of you may know—Gestetner Ltd., the Duplicator Company, which has about 2,500 to 3,000 employees at its factory at Tottenham. We have apprentices in the printing and the drawing rooms and in the engineering departments of the business; all these are allowed free time during the day to attend technical colleges and schools, and they seem on the whole to do extremely well. I entertain no doubt that, properly looked after, the youngster—I call him the youngster because nowadays we use the term apprentice in rather too wide a sense really; it used to mean indentured apprenticeship —is well looked after, and if he has the sort of chance that Mr. Howard was referring to in his interesting observations earlier, he does very well. I thought, however, that Mr. Carr, and indeed all of you who spoke, omitted reference to one or two factors which are worth bearing in mind.

I doubt whether the employer, large or small, is the principal factor, either in getting the youngster into an industry or training him there or retaining him there. I believe that a central and very much earlier factor, very much closer to the youngster, is the parent in the home. It really all begins at home. We have a substantial task before us in seeing to it that the parents apply their minds to considering the careers of their young men and young women. I do not support the idea, which I know is widespread amongst parents, that it is safer and better for youngsters to go into the large firms rather than into the small. I believe from many points of view that is a very great mistake.

I do not know whether you observe the wastage that there is in regard to what we

loosely call the apprentices. Take for instance those who enter their names for the National Certificate. Now the other day I heard Dr. Venables enunciate the proposition that 90 per cent—a terrifying figure—of the entrants are wastage: they simply enter themselves for the National Certificate but never proceed to it. That is a very alarming thought. What are the influences which bear upon them in that regard? I believe one of the dominating influences of a young man's life is the girl friend, and if you find that your young apprentice has what I call, or he calls, a 'steady girl friend', then all will be well. He will pursue his course and he will not have his interests too much diverted from the task immediately on hand, because he and the 'steady girl friend' are both thinking about setting up a home together as soon as they reasonably can. I would suggest to all of you who are concerned with young people that you should keep an eye upon the girl friend and if she is not too 'steady' then see if you can afford her some attractions that will make her 'steady'. I will leave that aspect of the matter to your consideration and any necessary action.

This year we are celebrating the Darwin centenary, the centenary of the publication of the theory of evolution. Don't let us overlook the fact that there is a constant evolution taking place in the whole structure and form of industry. It is not static. Now I will venture to throw a cat among the pigeons: you are the pigeons and what I am going to say is the cat. I think on the whole there is going to be possibly less and less room in the future structure of industry for the skilled craftsman. I believe that, with electronics and automation and so on, it is the technologists rather than the technicians that we shall require, and you will have to look, not to the individual working man or girl, the individual craftsman, but to the team. It is no good having the leader of the team a high ranking man unless he is supported throughout. It is no good having the craftsman, skilled craftsman, unless he has a leader. I believe that instead of dealing with individuals in the structure of industry we shall have to look more and more to the creation of an entirely new technique amongst employers, the trade unions and educationalists.

I now have said as much as I need to open this discussion. I have not said very much about what has been stated in any of the papers because there is nothing more disagreeable, either to the speaker or to his audience, than that the chairman, when he gets up, should edit the speeches of the speakers for the audience, who have already heard them once. So I have ventured to explore fresh ground. Having done that I throw this meeting open for discussion.

MR. A. WOODWARD (Regional Officer, British Productivity Council): First of all may I say something on behalf of Mr. G. C. Johnson. He is Warden of a Further Education Centre in Essex who was invited to this conference but could not attend. At this Further Education Centre work is being carried out which, so far as I know, is not being done anywhere else. The Further Education Centre provides, for apprentices from industry in Essex, courses for a liberal education—something which I notice with regret has not been mentioned so far this morning. The scheme which Mr. Johnson was going to outline to you is that the firms sponsor the attendance of groups of apprentices at this centre for four periods of a week each during their apprenticeships, and as the intellect of the young people expands, so do the subjects which they are given, in this 'away from industry' atmosphere, by people connected with industry and trade unions, with the arts, and with decent human values. If I may give you the results in only one case: the Extra-Mural Delegacy of Cambridge University have a hand in supplying lecturers to Wicken House, and so does the London University Department of Extra-Mural Studies. These two university departments last year admitted to their summer schools six boys who had completed the four sessions at Wicken. The reports of both summer schools were to the effect that the most mature students were those from Wicken, and that the most mature of the six were two craft apprentices from a very big firm in Chelmsford.

Secondly, I would amplify the information which has been given about group apprenticeship. The system that we have heard about this morning is by no means the only one, nor is it the largest or the oldest. There are two within a few miles of London, one based on Enfield and the other on the Dagenham area. They began after the war, when smaller firms found they were not able to give the experience necessary to train their young men as craft apprentices, and through the Enfield Manufacturers Association they were able to arrange an *ad hoc* exchange for such experience. The exchange was limited to boys who were past their eighteenth birthday and so had done two years of their apprenticeship with their original firm; this was found to preclude a certain number of smaller firms who thought they had not the facilities nor the time (nor the initiative in some cases) to do the actual recruiting and get the best instruction—nor of course was there a group training centre in Enfield. So one of the larger engineering firms offered to take a limited number of such boys into its apprentice training school for the first year. That scheme is at the moment in its third year of operation.

With regard to the one based on South Essex, the South-East Essex Technical College at Dagenham is its headquarters. After the war the firms in that area found considerable difficulty in providing the experience necessary for training maintenance mechanics, and so the South-East Essex Engineering Apprenticeship Association was formed. This has now grown and dropped the word engineering from its title. It has at the moment something over 200 apprentices from the five major industries concerned. The boys are interchanged for *ad hoc* experience, and the whole work is done by a voluntary management committee. The systems that I have been talking about both have one standard registration fee of five guineas, which covers the administration of the whole of the interchange that is necessary for the five year period. No other charges are involved except the payment by the employer of the cost of extra travelling if a boy is working away from his home works. The South Essex scheme makes use of Wicken House. I am quite sure that if you wish to see the sort of work which is going on at Wicken, Mr. Johnson would be only too pleased to welcome you.

I am a Regional Officer of the British Productivity Council. I know that my Council has considered that the implications of the Report and this discussion are of prime importance for us as a joint body. I believe that we can and will, if asked, provide all over the country such a platform for discussion as this society has provided here in London, for we are a joint body of employers and trade union representatives. The B.E.C. and the T.U.C. and the F.B.I. are three of our six sponsoring bodies. We have approximately 110 productivity committees and associations all over the country.

MR. W. F. GIDDINGS (Principal-Designate, Acton Technical College): I want to speak on the question of block release courses. Once again we find that new ideas seem to be so very slow in being taken up. It varies from area to area; it was very encouraging to hear of what has happened in certain areas in this respect, but lest we should get too self-satisfied, I should like to show the other side of the picture. Recently, in a very heavily industrialized area, the college, because certain demands or requests relating to training of craftsmen had come to our notice, called a conference to discuss the possibility of putting on a block release course for the new City and Guilds Craftsman's course. Of 120 firms written to, 68 replies were received; of the 68 replies received 40 were to the effect that they would like to be represented at the conference. From those represented, the number of apprentices which they were prepared at this stage to release for such a course was barely enough to justify running the course. Now it is not the college's job to provide courses and then persuade industry to make use of them. And therefore it is at the moment rather unlikely that (unless other firms are forthcoming to take an interest) such a course will be run at this stage.

The Chairman mentioned the question of possible changes between the three classes of craftsman, technician and technologist, as a result of modern developments. While I would agree that such changes in numbers in the relative groups are bound to take place, I would not altogether join with him in suggesting that craftsmen will, as a result, tend to vanish. There will probably be an enormous increase in technicians, to form the teams to work with the technologists, and that may result in a slight reduction in the number of craftsmen required, but I do not think they will vanish by any means. What I am rather worried about is that it seems that the technician section, which is one that should grow very considerably to meet these needs, is the very section controlled by those courses in which we have been told to-day there is such serious wastage. If that is so, then clearly there is considerable work to be done at that level.

I was very pleased indeed to hear the remarks of Mr. Howard. I fully agree with everything he said about pre-apprentice training; that it is something which should be produced at secondary school level and not be left to the technical colleges. I am quite sure he is right in pressing for more and more boys to stay at school until the age of 16. I think it is not sufficiently well-known among parents that colleges of further education run courses for which the condition of entry is normally that the pupil must have been in full time education until the age of 16, or alternatively have taken some bridging course elsewhere.

MRS. GABRIELLE OLIVER: I come from West Suffolk, which is a rural area. I am here representing the Ministry of Labour, Eastern Area, as Chairman of the Women's Sub-Committee. I am also a West Suffolk County Councillor and a Member of the Education Committee, and I agree with Mr. Carr that one should combine education and this question of apprenticeship. I dare to speak because twice he mentioned the word 'girls' and our Chairman inspired me by saying that they were the dominating factor, or something of that kind! I do deplore the fact that more women are not concerned with this matter of girls in apprenticeship. Surely we are quite important? We in Suffolk have our special problems that are probably unknown to you. We do not worry so much about our clever sixth-former, the girl with experience of science and mathematics, because we know that industry will quickly grasp the fact that she is of potential value, and I am sure that people here to-day have realized that and will see that her apprenticeship is forthcoming. We are worried about the ordinary girl who leaves the secondary school and, perhaps in our rural districts, has no choice except to work in a shop, office or small factory. We have very little industry apart from our great agricultural industry, and I am glad to say many of them go into that, but it is still not enough. So what can they do? We try very hard to place them in things like dress-making, design—furniture and shoe design—but we are repeatedly told that apprentices are not accepted in those trades, that the latter would prefer to have students from the schools of art. Well, quite naturally they would; but we do hope some of the larger houses will consider taking these girls because, as Mr. Carr has said, if you are going to squash every bit of imagination in our ordinary school-leaver we shall get frustration and juvenile delinquency.

The other matter that I want to raise has to do with the catering industry. You all seem to be considering very technical industries. I hope my points will not be considered too trivial, but I do think the catering industry is one that this country should look into very carefully. There is probably no country in the world with such bad reception and catering in its hotels. If you go into a good hotel anywhere abroad you will be greeted by a manager or manageress in any language that you are able to speak. I know a girl who has won a major award to study French and German. When I asked her what she intended to do, she said she was going into the hotel trade, and so I asked various people connected with that trade what were the prospects for a girl apprentice. One man looked aghast, and said, 'We never have women in

the hotel trade. The work is much too hard. It has to start in the kitchens and girls cannot do it.' Girls were strong enough to do all sorts of heavy work during the war, but now they cannot even carry things in kitchens—but that is only part of their training. Everything else connected with the hotel work I am sure a woman can do just as well; accounts, reception, food, care of silver, house management, waiting and certainly knowledge of wine. They say one can never teach a woman anything about wine. I am married to a wine merchant, and I think I have been quite an apt pupil! I do wish something could be done to persuade the hotel industry and the catering industry to give some sort of apprenticeship to our girls because I am sure their feminine flair would be of the greatest value.

There are many other lesser things some of our girls want to study—such as floral design—but can they get an apprenticeship for it? We cannot find them one. All they can do is to go to one of the fashionable schools where they have to pay an enormous sum of money, and where many of the other girls are only doing it in order to be in London. These things may seem very small to you but they are all disappointments that are helping to spoil the lives of good young women. We know that most girls are ordinary enough, and when we occasionally find the exceptional one in our secondary schools—I am a Governor of the biggest secondary school in West Suffolk—we are delighted to think that she wants to do something different. Yet we are unable to help her to train, and that is a great disappointment both to us and to her, and a loss to our country.

I have been asked to say just a word about boys also. In the small firms in West Suffolk they do not know how they are going to train their apprentices without some government impetus. I discussed this with many headmasters and employers before coming here, and they all had the same view. Perhaps you would also like to hear some thing about agricultural apprentices in West Suffolk. A new apprenticeship scheme began a few years ago and it was regarded very much with suspicion. People in Suffolk do not take very kindly to a new method; old farms have had their men and families from the same district for generations, and so they did not want to train boys from towns; but we have had boys from towns, whom you would never think had seen a cow or sheep, yet they are doing very well indeed. I spoke last night to the man in charge of this scheme, and he said he was surprised at the progress that agricultural apprentices are making, but that he thought the course would be even better if it were longer; five years instead of three would give a boy the chance to acquire a greater skill, and the man would be able to command a higher wage.

I thank you very much, Mr. Chairman, for allowing a country bumpkin to present some of our views in the rural districts.

MR. L. W. BRIGHT (Siemens Edison Swan Ltd.): I am the Superintendent of the Siemens Edison Swan Training School which my friend Mr. Woodward mentioned when describing the Enfield scheme. I am the man who takes these young men into our training school for their first year. The scheme at Enfield is an excellent one which has produced about ten very well trained apprentices. In some respects they are better than our own craft apprentices because our lads have not had the wide practical experience which is gained by working in a large number of separate firms. For example, none of our lads has had the experience of assisting in the installation of a rolling mill.

This scheme was begun by the interested large firms in the Enfield area which already had their own training schemes. The objective was to encourage the smaller firms to participate so that in time the larger firms could then withdraw from the scheme, leaving the smaller firms to look after themselves. Unfortunately this has not happened.

Mr. Carr touched on the need for employers' associations and trade associations to integrate and lead, but the great number of small firms in North London are those

employing five to ten people and they are not in these associations. We have contacted by letter a number of firms which are not yet sufficiently interested in the scheme, but they need a lot of shaking up. The 'shot in the arm' mentioned previously seems to be required! I do not know whether anyone here can suggest ways and means of reaching these really small people, but they are the ones who are missing.

The scheme as it stands in Enfield now has produced some excellent apprentices, but if the scheme had not existed the firms which have assisted in training these lads would have in any case produced that number of apprentices within their own training schemes, so the real point of a group training scheme has still not really been achieved. How can we get these smaller firms really interested?

MR. D. A. GUNN (Messrs. D. A. Gunn (Engineering) Ltd.): I speak as a member of the Engineering Industries Association group apprenticeship. I have looked through the list of guests, Mr. Chairman, and I see that there are many people here to-day representing big industry. I hope (I say this with all diffidence) that one day the Organizing Committee may invite 200 little firms which might be converted to group apprenticeship. I dare say these larger firms are here to hear about the small firms, and perhaps go back to their board rooms and award several million pounds to run our group apprenticeship scheme. Mr. Carr asked for a lead from industry. Of course he is right. What does he believe as an engineer on the Board of a comparatively small company? Does he believe that any trade association can harness fifty thousand small firms into a vast trade organization? This is far too big a job for employers' associations or trade associations. I never believe in saying the government ought to do this or that, but surely this is a case for government help. No trade association can do this great task by itself, nor can any trade union. The time is short and we are still failing to produce the skill. Let us face the facts. If Mr. Carr issued a report every week, 90 per cent of the engineering industry would still never have heard of it. So we are wasting our time unless we get some important lead from the government. Mr. Fletcher used the expression 'fire in the belly'. I had that three years ago, so I think I know part of the reason why there are only 180 firms in this attempted nation-wide group apprenticeship. My firm was the first to sign this document. My company, unlike the giants here, employs about 100 people, and we decided we would join the scheme, though with some apprehension. For what were we taking on? Four or five important human beings to whom we were contracted for five years. Now if I, with 'fire in my belly', felt like that, what do all the other firms who have not got fire in their bellies feel like? How do we convert them? Secondly, little firms live in a highly competitive world and make small profits. All men from small firms here will confirm this. And when it comes to a company like mine, with six boys, three away on Tuesday and three away on Thursday, I walk down the shop, and find three machines idle on those days. These boys have got to produce something—and we have to pay for their being away, and, of course, for independent supervisors as well. There is the problem as I see it, the loss of production and the daily needs—and I should like to end by asking Mr. Carr if he can go back to Whitehall and do something about it.

MR. L. J. SAPPER (Deputy General Secretary, Post Office Engineering Union): Although this morning session is primarily concerned with problems of apprenticeship in the smaller firm, we obviously cannot look at this subject without having some regard to general principles and basic ideas underlying apprenticeship training and technical training in general. We in the Trade Union Movement have a stake in the better quality and the better quantity of technical training in industry and better quality apprenticeship training. I say that with all sincerity, because under whatever social system we may live, this country in a short time has got to have an ever-increasing number of what we term craftsmen, technologists and technicians. Therefore I wish to speak briefly about the recent experiences of the Post Office

Engineering Department, which employs some 75,000 telephone engineering staff. This Department has the problems of both a large firm and a small firm, because we have large concentrations of staff in an area such as London, where the rate of concentration is related to the population, and small groups of staff, with perhaps one or two youngsters, in towns scattered in various parts of the country, such as Scunthorpe and Darlington. This year, we have really begun to tackle technical training, coupled with apprenticeship in the Post Office, for the first time. We have in fact extended the idea of apprenticeship, or the concept of technical training, right into the adult sphere, and for the first time this September we are going to release, on a paid day-relief basis from the Post Office Engineering Department, all those adults up to the age of 40 (and over in certain cases) who wish to acquire some recognized technical qualification. We believe there is a basic need for these opportunities, because in our field, as in every other, many technical developments are taking place. We must not divorce the idea of youth or apprenticeship training from that of adult training. We must not, I think, accept the old way of telling the youngster that he is to finish his apprenticeship on the day he is 20 or 21 and that he is then a craftsman. We believe that his technical knowledge has got to be developed, and therefore we are trying to do away with that division between apprenticeship and adult training.

The second thing which I think is very important is what we are trying to do to increase the broader basic knowledge of people. I believe it is completely wrong to say that a man has either got to be clever with his hands or his head, and he cannot be both. I should like to finish with a story which I think illustrates this false assumption. Sometimes, in order to instal telephone lines, one has to know the height of certain buildings which may interfere with the wiring. Well, one of the senior engineers gave three men a test. He said, 'Look, there is a church tower over there. We want to know the height of it. Here is a barometer each.' Now one of these men was the technologist type, with a Higher National Certificate; another was the technical type, with the Ordinary National Certificate; and the third was what is called in the Post Office a plumber-jointer, a man whom people say is clever with his hands but not with his head. The technologist measured the barometric pressure at the bottom of the tower and at the top of the tower, and by a series of intricate calculations worked out its height. The technician was more crude in this—of course he only had the Ordinary National Certificate—he went up the tower with a stopwatch, dropped the barometer, and knowing how long it took to reach the bottom, he calculated the height of the tower. The man who was only clever with his hands was cruder still: he went and sold the barometer for £2 and tipped the verger 10s to tell him how high the tower was!

MR. C. V. BERRIDGE (Executive Council, Amalgamated Engineering Union): I think it is quite proper, on the basis of the Carr Report and Mr. Carr's opening statement, that a great deal of attention is being given to the small firm and group apprenticeship. I believe that is one of the big problems and I have no need to elaborate it. But I must say that I am a little disturbed by some of the conclusions arrived at here in respect of schemes of group apprenticeship which have so far been initiated; surprised too, that the greater number of firms represented here are big firms, because in my experience and in that of the A.E.U., in operating the recruitment and training scheme in the industry we have found that not only is the problem of the small firm not finding an answer, generally speaking, not only are there big obstacles in the way of group apprenticeship schemes, but there is also perhaps a justified self-satisfaction on the part of the bigger firms in regard to the facilities they give for training. I would not detract anything from the merit of many of these schemes provided by the bigger firms, but the intake of indentured apprentices is largely speaking to satisfy their own needs and any further responsibility is, again broadly speaking, not acknowledged.

We speak of the small firms, but in my submission the responsibility must devolve upon the larger firm to take the initiative, to act as the convening body, drawing together around it, like a hen with its brood, the smaller firms. I see one friend* in the audience emphatically shaking his head; perhaps we shall get an argument about this point. Where the initiative is taken by a larger firm (by the Enfield Manufacturers' Association for example) we get the response. But there are also a number of practical questions which confront a small firm. And I am sufficiently ruthless to say this: if they find it difficult to meet the cost of day release we ought to tell them, quite emphatically, that if they are in the industry and taking advantage of trained craftsmen, they must bear their share of the burden and not expect somebody else to pay the whole bill.

Not the least of these practical questions which stand in the way of the small firm, however, is apprehension, dismay at the magnitude of the problem. If they accept an apprentice on this basis they enter into a contract of five years, and they cannot see the end of the road. In addition of course, there is the legal obligation: they agree to the contract, and if they do not fulfil it, what difficulty are they going to confront at the end of the period? When we come to group apprenticeship, how can we grapple with the practical question of indenture?—deciding who is responsible for accepting the control of training? This cannot be done by a joint body, and I would have welcomed from our friends in Enfield, or from South Essex, some illumination of this problem, some indjcation as to how the difficulty of the group apprenticeship and the signing of the indenture has been overcome. If we do not grapple, in a practical way and with expedition, with this question of group apprenticeship, I believe that the smaller firms, left to their own initiative, will not produce craftsmen, will not carry through apprenticeships. What they will produce are people with a very limited knowledge and experience of the trade who lack the qualifications that derive from a full-scale apprenticeship (and may I add, too, for Mrs. Oliver's benefit, that the Amalgamated Engineering Union favour the extension of apprenticeship to women or girls as well as boys).

MR. E. L. G. ROBBINS: So far as the Engineering Industries Association group apprenticeship is concerned, the problem of who signs the indentures was solved a long time ago. The indenture is between the sponsoring firm, which employs the apprentice, and the boy, just as if it was an ordinary large-firm scheme. I believe that applies elsewhere. In the building industry I think that the apprenticeship contract is between the industry association, the boy, and the firm. Mr. Berridge has been a bit hard on the large firms; they have already taken the brunt of the responsibility and cost of training, and if he thinks it is up to them now to tell the small firms what to do and get them going, I cannot think that many are likely to co-operate.

MR. P. E. TRENCH (Bovis Ltd.): The last speaker was a little misinformed on the question of apprenticeship in the building industry, and no doubt Mr. Woodbine Parish will put us straight on that.

May I begin with two disagreements. I disagree fundamentally with the speaker who challenged Mr. Robert Carr and said that this was a government matter and that the government must give a lead. I think this is, and must remain, a matter for industry, and if industry cannot solve the problem then it had better go out of business. (It will, in fact, go out of business if it cannot solve it.) I believe it can do so. In my own industry, and through the trade federations and associations, we are getting in touch with the smaller firm.

Secondly, if I am not out of order, may I disagree with the Chairman? I do not believe the need to-day is for technologists rather than technicians. I think that is far too general a statement, and again it certainly does not apply to my industry. It

* Mr. R. C. Winton. See p. 839.

is true that the present conception of craftsmen is becoming a little outmoded, but trained skilled men are still required.

I say, however, that the whole incentive of apprenticeship for the boy himself will disappear if, at the end of that apprenticeship, he has not a better future than the boy who comes into the industry and is not apprenticed. This is a big problem and one which has not received sufficient attention. I cannot see why anybody should want to enter an industry, and spend five years in training, if at the end of that time he cannot be sure of a better future than the man who comes in later on without that training. That happens to-day—anyhow in the building industry.

Lastly, Sir, as far as the small firm is concerned, I do believe this is a question of publicity and propaganda. I believe that many of the smaller firms do not know what facilities are available to them. To-day too we have heard many people talk about the cost of apprenticeship, but I do not believe that anybody has really costed apprenticeship within his own company. I have never seen figures, but—though I am open to persuasion on this—I do not believe that apprenticeship costs money. If that can be put across to the smaller firm, I feel there will be many more firms willing to take apprentices.

MR. J. ARNOLD WAITH: I am rather nervous of taking part in this discussion, because I do not occupy an august position like most of you; I am only a teacher who has spent the last ten years teaching in secondary modern schools. I am here to-day because this conference (particularly this morning session) is concerned with craft apprenticeship, and the secondary modern school is vitally concerned in this question.

I have not yet heard anyone say that there is any evidence to show that there are more boys of the right type wanting apprenticeships. However, I believe that there are. And the Chairman mentioned the question of parental influence; I agree that this point cannot be too strongly stressed. Time and time again I meet youngsters, in the schools in which I have taught, who have the right intellectual capacity but whose parents are unconvinced. We have heard again and again of the number of children in the grammar schools who are first generation grammar school pupils, whose parents send them to the grammar schools partly to satisfy their own ego, and take them away from the grammar schools the moment the law allows. I believe—and this is why I have plucked up sufficient courage to speak to you—that industry, by the right kind of publicity, can induce parents of sufficiently academic boys to take up industrial apprenticeships. You see, I am not at all satisfied with what is being done in the educational field. I hear of firms which actually encourage children to leave school at 15, because they prefer to have them at 15 rather than at 16 so that they may have twelve months to know what they are like, and then decide whether to apprentice them. I have spent a splendid twelve months in Birmingham, where I have made contact with many small firms, and as I hear that small firms are not particularly interested in apprenticeship, may I just tell you of one managing director who said to me the other day, 'Mr. Waith, one of my lads just got the Higher National Certificate', and he was full of excitement about it.

May I add this: when boys begin their apprenticeship they are going through perhaps the most difficult time in their lives, a time when they need guidance. I think perhaps we expect too much from them. We expect them to be able to look ahead. The other day I heard of a boy who left school when he was 15 unable to read or write—he is now 16, earning £9 10*s* 6*d* a week. Yet we expect intelligent boys to begin work at the age of 15 or 16 at about £ 2 10*s* 0*d* a week, and when they are 21 industry promises them about £4 or £5 a week!

MR. J. C. KINGSLAND (Headmaster, Cray Valley Technical School for Boys): Unlike the last speaker, I make no apology for speaking to you or for being here. I am proud to be here. In Kent we have a number of newly established or rapidly

developing technical schools, and we have a very important part to play in providing the kind of material that will form the technical college classes. Our particular committee has provided us generously with workshops, drawing offices, engineering laboratories, and we have all the material facilities for doing the job. I want to make a strong plea that you should consider doing what we are doing, and release some of your staff to make contact with the schools. This morning we heard from the Headmaster of Forest Hill that he would like much closer contact with industry for his school. So should we, and we have gone some way towards establishing it. In spite of the fact that we have staff shortages we have arranged to have one member of our staff free at any time to be in a local factory. Our problem is that on the craft side in particular we cannot get enough of the right kind of man; we cannot get the man who is a good teacher as well as a good craftsman. We can get schoolmasters who have been to a training college but have not had industrial experience, and it is in order to try to cure that in some measure that the Kent Education Committee allows us to release one member of the staff at a time to industry for a period of three months. We are trying in that way to provide an up-to-date industrial background for these able young schoolmasters who are coming to us from training colleges. It is not a substitute for true industrial experience but it is the best we can do in view of the acute staff shortage.

Mr. Carr said that when you are trying to teach apprentices you very frequently find that your apprentice trainer lacks teaching techniques. We have the men with the teaching techniques and not the industrial background, you have the men with the industrial background lacking teaching techniques. We have made a move from our end towards trying to get our people out of school into industry. Is it too much to ask that you should try to squeeze time for an apprentice trainer or some other member of your staff to come into our schools for a period of three months? We would welcome such a man in our workshops. He could learn a great deal about the technique of teaching from people who are good teachers themselves; and they would acquire from him a great deal of 'know how' in the workshops. He might also be able to do what I think is a very essential part of our job—impart to these boys an enthusiasm for the idea of entering industry as a career. My own school is a technical school—we feel that we have to give all our boys, whatever they are going to be, a good liberal education, but we do this by having a core of technological interests which sends the majority of boys leaving school into industry. From your point of view, in order to prevent wastage, it is important that we should try to ensure that the boy who comes to you does so because he wants to work in industry for a living, and not because he cannot find anything else to do. So we do send parties of boys and masters out of the schools into local factories, but I have failed almost entirely to attract visitors from industry into my school. I should welcome your personnel officers, the men who are in charge of your apprentices' training, executives—anybody—to the school. We should welcome their advice, and help, and I am quite certain that if we can get a much closer integration between the top end of our schools and the lower regions of industry on the training side, a great many problems such as wastage can be avoided.

MR. R. C. WINTON (Mullard Ltd.): It was I who shook my head when a previous speaker* said that he felt large firms should take the initiative! My reason for doing so is, briefly, because I feel that large firms already have enough responsibility. They have to undertake the training for vacation students, training for F.B.I. scholarships and various schemes of that kind, and it is also on them that part of our educational structure now depends. For instance, it is only by the large firms sponsoring students in the new Dip. Tech. sandwich course that that can possibly

* Mr. C. V. Berridge.

succeed. If I shake my head, then, it is because I feel that large firms are doing perhaps more than their share already in this matter of practical training.

There is one point I should like to raise in connection with the E.I.A. scheme. We hear so often that money is the root of all evil; it is also the root of the evil that there are not more schemes of that kind. Therefore I am interested to know how this is financed. Is it done jointly by the firms taking part? Does somebody who sponsors an apprentice put a little more in the pool? If any of the participating firms do not require further apprentices for the time being, are they still prepared to go on paying?

If one lives with anything long enough, I think one tends to stop questioning it, and I want to touch here on rather a controversial point; actually how great is the shortage of apprentices? This shortage has become so much part of the language, that we do not stop nearly often enough to question it. If there is shortage, where is it, and how large is it? Mr. Robert Carr said that industry was unable to quantify its requirements, by which I gather he meant that they did not know how much they wanted. It seems to me that the requirements must be at the root of all discussions of this kind of problem. We know that scarcity is wasteful; in times of scarcity the honest man asks for the maximum he can manage with, and if he is not quite so honest he adds half as much again. I often feel that if to-morrow we could say, 'Everybody can have as many trained people of all grades as they need', we should be surprised how small the actual requirements were. It is not just a question of short term policy, of training sufficient people for a few years hence. We know the old saying that if you plan for twenty years you plant men. We are planting men, and if they are not required when they have grown we cannot put them into a cupboard and say, 'Well, we will put you in stock and use you when we want you'. I would therefore be very interested to know other people's feelings about the actual need for apprentices. Many people with whom I have discussed the matter have agreed with me that the shortage is not so great and alarming as it is supposed to be.

Finally, may I cap the parliamentary story which Mr. Carr told you with one having an obvious moral for myself. A young Member of Parliament approached the Prime Minister and said, 'Prime Minister, I am most doubtful whether I should speak or not in the debate this evening'. The Prime Minister replied, 'It were much better that Members should ask why you did not speak than why you did'.

The Chairman then declared the discussion at an end, and the Conference adjourned for the luncheon interval.

THE AFTERNOON

SECOND SESSION:

OPPORTUNITIES FOR CLOSER CO-OPERATION BETWEEN INDUSTRY AND EDUCATION IN APPRENTICESHIP TRAINING

THE CHAIRMAN: Mr. Robert Carr has asked me to express his regret that he is unable to be here this afternoon. I have in turn expressed to him (I am sure with your agreement) our sense of indebtedness for the interesting address which he gave to us. We are not obliged to agree with everything he said in order to appreciate

that it was a valuable contribution to our discussion. We are very fortunate to have had the Chairman of the Carr Committee here to-day.

We now turn to the subject of opportunities for closer co-operation between industry and education in apprenticeship training.

MR. D. E. WOODBINE PARISH (Chairman and Managing Director, Holliday and Greenwood Ltd.): The subject in the second session has, I feel, already been introduced by about eight or ten speakers this morning, so if I do go over some of the same ground I hope that I may be forgiven.

Can I begin by stating certain fundamental beliefs that I hold? First, that I think that in this country we have to ensure a very wide awakening to the present position in respect of apprenticeship and technical and technological education. The economy of this country is a peculiar one. Our inability, due to limited natural resources, to provide for our basic needs has produced a highly complex industrial community, and the long term prosperity of that community depends as I see it almost entirely upon the future capacity and level of industrial skill and commercial ability of the next generation—that is, of those people who are leaving school and are beginning to train for industrial and commercial employment. We must recognize that these young people are our most important national asset, and unless we make far better use of them, and provide better opportunities for them to exploit their latent abilities, the future prosperity of this country may be in jeopardy. Secondly, I think that there are many misconceptions about apprenticeship and industrial training of all kinds. There is a lack of a clear understanding of the facts. As one speaker said this morning, one of our chief problems is publicity, to make the general public far more aware of the importance to the national economy of well conducted industrial and commercial training schemes and apprenticeships. There is a failure on the part of the general public to recognize these fundamental and vital points.

Next, I think most of us who are in industry are worried about the idea of some form of legal compulsion with regard to apprenticeship training. Nevertheless on the other hand there are many of us who doubt whether the voluntary participation basis is really going to produce adequate results. Somewhere between those two views a formula must be found which will impose the necessary disciplines in industry and commerce to ensure a far higher rate of activity with regard to training the future citizens of this country. I believe that there is a force which has been so far untapped, and that is public opinion. Public opinion in this country can do things which the government cannot do, nor any industrial or commercial source, and until we stir the public consciousness to this fundamental problem much of what we do is going to be dissipated.

Reference was made this morning to the parents. Both parents and employers need to know far more about the facilities and opportunities that exist in the technical colleges and in industry for the training of their youngsters. We need much better arrangements for advising and counselling both the parents and school leavers in regard to their selection, their placing and their induction into training for industrial and commercial employment. I refer to both industrial and commercial employment because I think this morning the emphasis was on

industrial employment, and commercial employment is surely just as important. It is no use producing goods and services unless our men of commerce are able to ensure that they will be sold to advantage in the world markets.

I was delighted to hear the lady from West Suffolk refer to the fair sex. This is a very masculine audience, and we must never forget that there is an immense potential in the girls leaving schools which at the moment seems to be hardly touched.

Industry and commerce must also play a more active part in the work of technical colleges. In a period of rapid technical and technological growth it is no use teaching individuals a set of tricks which are 'contemporary'. One has to get down to very much more basic knowledge, and ensure that students understand the technology and the science behind their particular calling.

I have been privileged to sit recently on a committee at the Ministry of Education looking into the whole problem of publicity and public relations. The regional advisory councils, all of which were invited to submit observations on this subject, indicated that while in certain technical colleges the advisory committees are admirable and work well, there are other areas where they either exist only on paper or do not exist at all; and therefore every endeavour must be made to expand the use of advisory committees as a means whereby both industry is aware of what is going on in the technical colleges and the technical colleges are made very much more aware of the fundamental needs of industry. Then there is the question of the governing bodies of technical colleges. In some areas the governing bodies of technical colleges are fully representative of industry, in others they consist substantially of representatives of the local education authority, and their contacts with the knowledge of the broad needs of industry in those localities is insufficient. I cannot see any other reliable means of ensuring the close collaboration which is really necessary between the technical colleges and industry and commerce unless the members of advisory committees and governing bodies are widely representative and have the fullest opportunity to exchange views and understand each other's problems.

There is a further point to which I think local education authorities must address their attention: that is trying to equate and correlate the work of the secondary schools and the technical colleges. There is evidence that in certain areas this joint approach is very sound, but the evidence of other areas is not so happy; the headmasters of the secondary schools, and particularly of the grammar schools, have little knowledge of what goes on in the technical colleges, and this quite obviously is an unsatisfactory state of affairs. My hope is that it will be possible in the future to see a much closer contact between the heads of schools and the principals of colleges so that their respective fields of activity are made very much more complementary than is the case at the moment.

The regional advisory councils exist to determine the optimum provision of technical education to suit local needs. Unless the maximum use is made of the limited college accommodation and equipment we have, we cannot hope to get full advantage from large sums of money spent on technical education. The regional advisory councils, whose work cannot be overstressed, also have a vital

part to play in helping industrialists to know more about the work of technical colleges. We tend to assume far too readily that industrialists are entirely familiar with all that goes on in technical education. Outside this room I think that it is unlikely that you would be able to find many individuals who could readily answer simple questions as to the difference between national diploma courses and certificate courses and what the functions of City and Guilds and Regional Examining Unions really are.

I also feel very strongly that as employers we have to pay greater attention to the moral training of young people in industry. Not only are their technical skills important, but we cannot escape our social responsibility in leading young people to accept their moral responsibilities to the community in which they live. Large, medium and small firms have this responsibility. It is a collective responsibility which we must accept and share, and we must willingly participate in any collective schemes which can be developed in this field. In this connection the growing importance of the Youth Employment Service is one which must be recognized, and full use made of its services. Many young people have started off on the wrong track largely due to a lack of good guidance, or the opportunity for discussing the problems of industrial employment and industrial training at the critical school-leaving age. The youth employment service and the employers organizations have an important part to play in this respect in view of the present high level of wastage.

I could not help but agree with every word that Mr. Carr said about employers' associations. Last time I heard him speak, he was still in the Government, and no doubt he had to be a little bit more cautious. To-day I felt that he was really outspoken, as he should be. Employers' organizations must accept an increasing responsibility for identifying and assessing the future manpower needs of their respective industries. They must define and implement positive policies with regard to the planned conduct of industrial apprenticeship and training. If they fail to do so, they are going to find that the right type of young man will not come forward. The provision of statistical information with regard to the local, regional and national needs of each industry is a matter requiring very, very high priority. Reference has been made to the possibility of the establishment of a new national industrial training council. I believe that that is likely to come about, and I hope that the opportunity that such a body will have of influencing and assisting industries to recognize the fundamental and underlying principles of the recruitment and training of young people will be fully exploited. The exchange of ideas and experience can do nothing but stimulate a closer and a more enlightened approach to the solution of this current problem.

I imagine that I may be expected to refer briefly to the scheme that exists in the building industry with regard to the recruitment and training of apprentices. We are very fortunate in the building industry in that we have a National Joint Apprenticeship Board, which consists half of employers and half of members of the trade union movement, who administer a national apprenticeship scheme. We believe that we have a very good apprenticeship scheme, and that though it may want certain revisions it has stood the test of time. We have scholarships

which are provided by funds raised by the National Joint Apprenticeship Board, and I think we have a pattern which other industries could follow. I believe also that, as an industry, we could learn very largely from what other industries do.

The opportunities that will arise from a national industrial training council to promote the cross-fertilization of ideas and experience will provide the stimulus that is so necessary for very much more detailed thinking between employers and employees in each industry.

If I may return to the point at which I opened. I am convinced that we shall get nowhere at all until we are able to impress upon public opinion the urgency of this whole matter. It seems to me that the central core of our problem is to get the man and the woman in the street to recognize the long-term economic implications of failure to adequately train the future industrial and commercial intake of this great country.

MR. C. L. OLD (Group Education Officer, Vickers Ltd.): As the last man in I am sure I am not expected to make many runs; and in this field of activity there is a limit to the number of runs that can be made. Unlike cricket, where you can go on indefinitely and tot up the score, this is a field in which the number of runs that can be made is quite limited and many of those runs, as I anticipated, have been made. It therefore struck me, Sir, when I was asked to take part in this meeting, that perhaps I could cast myself in the rôle of a real pessimist—that I could perhaps, instead of taking the positive view, try to ask questions as to why certain of the obvious things which we have been hearing about to-day are not in fact being done.

We have heard about group apprenticeship schemes, about pre-apprenticeship training, and about various other things which are in fact taking place in various quarters here and there, but on a relatively small scale. Why is it that industry and the colleges and education in fact are not falling over themselves in an earnest desire to do what each knows has got to be done? Mr. Carr of course must, as a good parliamentarian and one who understands the democratic system thoroughly, go around quietly advocating and trying to persuade. In the long run, as Mr. Woodbine Parish has just said, it is only by the force of public opinion that we shall really achieve what some of us think is essential; but in spite of that I see no reason why there is not room for somebody to ask some pertinent questions as to why the very obvious things are in fact not done automatically.

This afternoon we are really considering the relationship between education on the one side and industry on the other. I will not try to define those too clearly, but we know that they are separated by a fundamental gulf. There is something which keeps the two apart, and that is the point on which I should like to start. I think that 'something' is inherent in the thinking that goes into the making of these two quite distinct parts of our society. On the one hand the schools, the educational system, and therefore to some extent the technical colleges, are essentially individually based. I do not think anybody will pretend that industry is individual-centred, far from it; it has an entirely different point

of view. Not only is their thinking separate, but I think too their administrative and their economic outlook is also quite different, and from that we can trace a number of things which are, as it were, impediments to the achievement of desirable results—in fact to the things we have been hearing about this morning. Stemming from what, I think, is the fundamental difference in outlook between these two sides, we get a number of things, and I should like to mention them in some detail. First of all, the real contact between people, as between industry and the educational system, must be the teaching staffs of our technical institutions. As far as the colleges are concerned, they surely must be the people who are responsible for the instruction and the organization of the instruction. Now, with a few exceptions, can anybody deny that the number of occasions when teaching staffs in technical colleges get into industry to see what is going on there is lamentably small? Why is this so? I suggest that it is a matter of priorities; and the man who is determined to get back into industry from these colleges will go in spite of these things which tend to hold him back. How many principals of colleges to-day can look around their heads of departments, for example, and find one in ten who has attempted, let alone succeeded in, getting out to see what is really taking place? I think then, the first thing is the will. The difficulties are real, and we must look to local authorities to ease the staffing situation as far as they can. I know the difficulty of shortage of people, but that is a relatively new shortage. Staffing tends always to follow needs and hardly ever to anticipate them. The first attempt is to run the course on the existing staff, and if it succeeds, to bring in extra staff; so that the net result is that the staffing situation is invariably behind the course development situation. I think perhaps industry has a part to play in this. I feel quite strongly here that industry should take a much more active part in specifically inviting heads of departments to come down to the works and discuss specific problems. Why not in fact have a chair in the managers' mess into which the head of a department can come whenever he pleases? This is what I would think of as co-operation between industry and colleges, when the people who matter really get together. Another detail is the lack of clerical assistance which many of our colleges receive. The amount of clerical work certain people have to discharge is enormous, and it is quite improper that they should be expected to do it when their real job in life is dealing with an engineering science or something related to it.

Then the other point of contact, at a rather different level, is through our governing bodies. Mr. Woodbine Parish has referred to this and I suspected that it would be mentioned before I had an opportunity of coming to it. This is a matter where we have been very negligent. Much depends on the people we get on our governing bodies. It was Chesterfield who defined a gentleman as a man who is at home in the world; well, what we want on our governing bodies are men who are at home in the world. Men who hop on a plane to New York, sign a contract, and are back again at the end of the week—they are the kind of people, people who are driving industry, whom we want. Yet how many governing bodies of colleges in this country have any such people? (The number of them in the whole of this country is very small indeed.) Rather it is the

man who has not a great deal to absorb his attention in his daily work who finds time to expand himself in social work; and very regrettably he is usually tied to one political party or another; he comes in and takes charge of our governing bodies. Such men are worthy citizens, as indeed John Gilpin was, but they ride their horses still, and have no knowledge of the real needs of technical education to-day. It is up to the local authorities to do something about this, to make quite sure that in fact the kind of people who know what industry is doing come into our circles and take an active interest. Reference was made to the National Foundry College course this morning. I was Director of that Institution for a time and I saw the governing body in action there—it was mainly composed of industrial people of high rank. I am not saying it has reached perfection, but it is doing a good job and one of the reasons is that it has people who 'think big'. On this same theme, what sort of things are discussed at governing body meetings? Almost every college with a governing body will I am sure have spent more time in discussing such things as window cleaning contracts than in discussing the White Paper on technical education! This is literally true. The agenda for these bodies is the clue, but the man who draws them up has unfortunately to watch his step: he dare not move unless he is covered by an appropriate minute; so that in the long run the agenda is drawn up with that object in view, and window cleaning, which costs money, is more important than White Papers.

What about industry? Is industry in fact blameless in this pessimistic picture that I have drawn? I submit that it is not. In the first place industry is very much suspect from the educational side because it blows hot and cold. We spend a lot of time talking to schools and to some extent the technical colleges, and we say that we must have the best boys—industry is vital to this country. The grammar schools and other institutions are quite prepared to send boys to us. Then there is a slight recession and we do not want them any more. Is that going to build up the confidence of educational authorities and technical colleges in the goodwill of industry? There is almost a complete absence of any form of planning. I wanted to say a word or two about the Carr Report, and here perhaps it is relevant. I feel that Mr. Carr is quite optimistic if he supposes that industry is going to take the necessary action in all this. As far as I can see, industry very seldom sees further ahead than the next chairman's report. As for planning its intake—I think it hasn't a clue! In fact, Mr. Carr's report itself indicates that this is broadly the situation. In one quite considerable section of industry, the managing directors and the general managers of companies are not likely to take a single extra apprentice because of the bulge, and they are not likely to do so for several quite good reasons. The first is that they have been persuaded by their commercial managers that there is not the money this year to pay for apprentices. What this has to do with the needs of trained men in five to ten years time (which is, after all, the time when these boys become useful) I fail to see; and yet we are tied to the state of the order book to-day for our future output of apprentices, instead of having a long term plan which assumes a gradual expansion of industry up to at least the national figure of 3 per cent per annum. Work back on that and you surely have some idea of the number of boys who should come in.

Intake should not be related to the state of the order book to-day, it should be related specifically to the need for trained men in five to ten years time.

The second reason why these general managers are not likely to take in more boys is that there has been no planned estimate of what the intake ought to be. And the third point is quite specifically that the trade unions will not allow any departure from the proportion of apprentices to be trained. It is good that the trade union leaders should be associated with the Carr Report; it is good to have had Mr. Fletcher with us this morning; but at the shop floor and works level certain trade unions are not going to allow the proportion to change.

I said I was going to be pessimistic. I am afraid I have been. But I felt these things had to be said, because it is of no use going away from here to-day feeling that everything is all right. I believe that there is a great deal wrong and the signs as I see them indicate that we shall not in fact absorb this bulge; we shall go through the period of the bulge and come out the other side with large numbers of boys (or rather, young men) who are untrained, and they will present us with a different kind of problem. I have seen something of the French system and of the German system; I have seen how both industry and education can get together. I know that in the French system they have rather a good idea, something in the nature of an apprenticeship tax. Any employer using skilled men is required to put something back into the kitty towards the training of new men.

I am not content that this should be left alone to industry, in spite of all that Mr. Carr has said to us to-day. I am afraid I am rather on the side of the people who have attacked him on this. I do not think this is going to be done without a strong government lead. It is a pity Mr. Carr is not here because I know he wanted to say something in answer to this, but I am still convinced that we are not going to solve this bulge problem as things stand. If education as a whole and industry do not get together, we are in the hands of the Russians. That to my mind is the great compulsion behind this problem.

DISCUSSION

DR. C. B. FRISBY (Director, National Institute of Industrial Psychology): Unfortunately I was not able to be here this morning and consequently it is quite possible that some of the things which I shall say now have already been said by other people. I think I was invited because of the letter I wrote to *Technology* last November, giving some information about a group of engineering apprentices about whose progress the Institute had been collecting information over a period: the figures showed that of some 1,850 craft apprentices 63 per cent did not reach the level of the O.N.C. or the final City and Guilds Certificate. This seems to have created a certain amount of argument in both industrial and technical college circles; but to my mind it is not really very significant to talk about failure rate or wastage rates. The real issue appears to be that the courses which have been available to craft apprentices in engineering (and I can only speak for the moment of the engineering trades) are not really appropriate to the needs of the larger proportion of them. Since we are this afternoon considering the relationship between industry and technical education, I should like to suggest that one of the most urgent needs is to study the job content of the various trades for which technical education is provided in order to discover what the craftsman really does need to know. It is

pretty evident that he does not need to know all the things which are at present taught in the City and Guilds and National Certificate courses, since apparently the large majority of craftsmen have not succeeded in these courses and some of them have made very little progress at all. One cannot blame industry or the technical colleges for this state of affairs at present, because so far as I am aware no one has ever made the systematic study necessary to determine the details of what is required in the way of knowedge for the different crafts, nor for that matter what is needed in the way of skill. I do not underrate the contribution of the City and Guilds Advisory Committees, but I think some more detailed study is required. It seems to me very likely that the new City and Guilds Mechanical Engineering Craft apprenticeship course may meet a need for the engineering industry, but as General Lloyd remarked to me not long ago, the problem is likely to be how to get boys to follow this course. The certificate courses have been the traditional road from the shop floor to the design department to the managerial levels, and it can be reasonably said that every boy who really wants to attempt the certificate course should be allowed to do so. At the moment it seems to me that in the technical colleges the process is one of selection downwards. A boy may begin the certificate course, and if he is unsuccessful, then he has to be demoted and suffer the frustration of failure and try again on a lower level. What I should like discussed is the possibility of an organization whereby everybody began on a common level course and then worked upwards, instead, as at present, of beginning at what may be too high a level and sinking downwards.

MR. H. A. WARREN (a Member of the Conference Committee and Principal, South-East London Technical College): My whole instinct is to repel the attack made by Dr. Frisby, but probably on the principle, 'What should they know of England, who only England know?', my 'three-line whip' is to say a few words in general about how these things are done abroad. There is always the danger that one who has had the privilege, as I have had in the last two years, of studying intimately the apprenticeship and technical education systems of France, Germany, Holland and (partially) Switzerland, may come back an enthusiast for everywhere except his own country. I hope I shall not fall into that trap this afternoon. I will admit that in my first love, France, I was rather bowled over by the particular efficiency of their systems of apprenticeship; but since I have seen the other countries and the very different ways in which each tackles this problem, I realize that nobody holds all the cards, that we have all got a lot to learn from each other and that there is much that is good in this country despite what is said about its apprenticeship methods. The Six, the new European Economic Community, have, by the terms of their treaty, an agreement to exchange information and to some extent assimilate their technical education systems. We are not one of the Six, and therefore must be careful that we do not become a back number or an outsider. We must watch and be ready to take over anything that we feel is good *in relation to the needs of this country;* for it is very difficult to have any *absolute* standard of comparison. That which is good in the sense that it fits the peculiar conditions of French industry may not fit the different requirements of German, Dutch or English industry. So the most I can do is to examine the salient features of the systems in France, Germany and Holland, and see where they differ from the systems of this country; not to come to any conclusion, but to ask questions and leave it to this conference to decide the issue—good or bad?

In all those countries the normal period of apprenticeship is about three years; it is sometimes less, sometimes more, but one can take three years as the norm. Obviously this has got many advantages. On the other hand, if you think of applying it here you may cause a complete break at the end of the third year, and this may upset the technical education that is concurrent with apprenticeship. So it is not

all one-sided when people speak about the great advantages of reducing the period of apprenticeship. Another salient point is that it is very rare to find any apprenticeship scheme in any country that does not impose a terminal examination. The French *certificat d'aptitude professionelle* is of normal occurence at the end of apprenticeship; likewise the *Facharbeiterbrief* of Germany. In some countries it has optional value—that is, you can still go on with your career whether you have got it or not—sometimes, as in Germany, it is absolutely necessary—you are allowed two tries, if you fail both those you are out for life! The examination nearly always contains a very solid test of craft ability. I know this is also the case over here in a few industries, such as for example, motor vehicle mechanics; but there are many trades in which all that is required is to serve your apprenticeship for five years, and no final examination is imposed. If you ask yourself what we mean here by the word 'apprenticeship', I think you will primarily connect it with the idea of serving a period of five years under some sort of contract. If you think, however, of the French *apprendre*, to learn, the connection is obviously with the learning process in apprenticeships; and therefore the learning process in the *workshop* of these countries is given a great deal more stress than it is in England. In at least one country, the technical branch of the Ministry of Education is the controlling body; in Germany the controlling body is the *Industrie- und Handelskammer*. So again, there is no standardized solution; one country swings towards education, another towards practical utility; but if you take the general average, you will find that the learning processes of apprenticeship are rather more seriously appreciated and regularized on the Continent than they are here.

In all the countries I am considering some reduction of the period of contract will be given for a suitable period of pre-apprenticeship training. That is carried in France to its final conclusion: in France you can serve your *whole* period of apprenticeship in a *centre d'apprentissage*—a cross between a college and a workshop—engaging as far as possible in real production work, and yet providing a good deal of general education. In the *Berufsfachschule* in Germany 50 per cent of the time so spent is deducted from your subsequent period of apprenticeship. Some allowance is made in all those countries for recognized and well conducted pre-apprenticeship courses, whether they are conducted in technical colleges or perhaps under the auspices of a quite different organization. For example, in Holland the Churches, both Catholic and Reformed, are very active in organizing full-time technical schools providing pre-apprenticeship courses.

My next observation concerns the greater use of full-time education than (our) part-time education. I think the very fact that we were pioneers in part-time education—from 1920 onwards with the National Certificate, but even earlier with the City and Guilds and other part-time courses—together with the fact that we have a density of population which allows part-time attendance, has led us to continue with part-time education and to think more highly of it than the other countries. The very rapid change-over in the last few years to 'sandwich' courses gives some support to the idea that the part-time system is, so to say, wearing thin.

A German apprentice, having finished his apprenticeship and then a small extension period of six months or so, can (and here the financial question enters) secure entry into an *Ingenieurschule*, an establishment where he can in two or three years gain a qualification something like our Higher National Certificate, but on a wider educational basis. And the amount of time and money that apprentices or their parents are willing to spend in full time education is on the whole considerably higher than here. What is the reason? Is it different wage differentials? From inquiries made I could not substantiate that. There seems to be a higher prestige attached to the ideas of qualification, status, college, etc., than here.

Next I come to the question of greater attention to the national organization of apprenticeship. We are trying now for the first time to set up a National Council

to extend and administer the various systems of English apprenticeship. But such organizations have existed for a very long time on the Continent. There is, for example, the *Chambre de Métiers* of France, a compulsory organization for all employers and journeymen in the rural or small trades. It is a compulsory organization, extending over the whole country and administering apprenticeship in the crafts such as bakery, confectionery, boot and shoe repair, and so on. There is the *Industrie- und Handelskammer* of Germany. In Holland there is the Joint Apprenticeship Council, operating for each industry with co-operation from the technical branch of the Ministry of Education. There is the famous Statistical Bureau in Paris, which tries to gauge the needs of industry in five years time and to adjust the numbers entering the *centres d'apprentissage* to accord. The result is that the placement figures from the *centres d'apprentissage* of those going into the trade for which they were placed are as high as 95 per cent.

Then there is the moral element. In Holland a very active interest in technical education is taken by all the religious organizations. I was encouraged in Germany to see the work of the Y.M.C.A. and others in providing youth hostels, and the real work of liberal education, and moral character-building of apprentices, in the Ruhr steel industries, and in other works. How much do we accomplish in that direction? Are youth hostels used here as part of the moral and liberal education of apprentices in this country? How much of juvenile delinquency is due indirectly to adult delinquency—I do not mean delinquency in the sense of crime, but in the sense of failure to face some of these problems and to do as well for our apprentices as is done for some, but not all, apprentices elsewhere. I do not know the answers to those problems, and I put them as questions. I only know that a great deal remains to be done, but that if we can continue the good work of the Carr Report there is no reason why the quality of apprenticeship in this country should be second to any in Europe.

MR. H. SMITH (Association of Engineering and Shipbuilding Draughtsmen): I want to follow the lead given by Mr. Old in putting some restraint on the back-patting that went on to a certain degree this morning. I am a draughtsman in industry and I receive in my office several of these people who are called 'trained'. I am also a part-time teacher and do a little towards teaching the students anything I can from my industrial experience. I am on the Executive Council of my union, so I can protect them from the union side; and on the educational body of the union, which covers not only normal adult education but technical education as well. I am an adviser on the B.S.I. and on several committees of the City and Guilds Institute. So I can claim to know something about technical education.

My union has been trying for years to get a real training for draughtsmen, because what has been said to-day about industry applies most of all to my craft. First of all, you need to understand machine shop practice, fitting shop practice, inspection, welding, production, pattern work, foundry work, costing, buying, and have the ability to make a drawing that can be read. Now, in addition to these requirements, the draughtsman in the small offices is a designer, and he needs at least his Higher National Certificate or his final City and Guilds Certificate in order to do his job properly. In addition to all this he must have a further quality that cannot be taught: power of invention, mobility of mind. I studied the apprenticeship system in Germany and France within the last three years. I visited a big works outside Dusseldorf where they have a wonderful training scheme for apprentices, a fine school where boys work for four years and then obtain their diplomas, if they satisfy the examiners. When I suggested that a man might become a draughtsman from that school, my guide threw up his hands in horror, and said, 'We do not train draughtsman here, we train fitters and turners'. Therefore there was no mobility of mind induced by the German way of training. If you want to be a draughtsman you

have got to decide to be a draughtsman at 16, 17 or 18, and take steps accordingly, with the result that you have a 'set' mind—whereas a mobile mind is essential.

I want to add something to what was said by Mr. Old about restrictive practices by the trade unions in respect of allowing apprentices to come in. In the drawing office it is just the reverse. We had a case on the Clyde where there were 36 junior to 10 senior draughtsman. How on earth can one senior draughtsman train 3½ apprentices and do his own work at the same time? It is utterly impossible. It is cheap labour; you are getting your lines drawn cheaply and that is all there is to it. These boys are slung out semi-trained, and when they try to find a job in industry the first thing the employer says, very properly, is 'Where were you trained?' I happen to be engaged by a company long established in the London area, and they have the finest training scheme for apprentices I have seen. They encourage them to the last degree; there are sandwich courses and part-time day courses; and in addition to that, they encourage the boys to continue their studies even after they are 21, taking days off to study for their endorsements or for the Higher National Certificate. I am pleased to be associated with one of the latest courses which has just come into being from the City and Guilds: the draughtsmanship course. I would urge every employer to take note of it, because I think it is going to be the very thing we have wanted for a long time.

MR. R. K. KIRKLAND (Assistant Director, City and Guilds of London Institute): Our specific subject this afternoon is the co-operation between education and industry, and there is in this country some mechanism for that. The City and Guilds of London Institute is part of this mechanism for connecting industry and education.

In particular I should like to pick up a remark made by Dr. Frisby about the need for defining the job for which a man is being trained, the job to which his technical college course should relate, and so on. Well, we have a system for doing that, however imperfect and unscientific it may seem to be—a structure of advisory committees. It is not fashionable in the age of Professor Parkinson to boast about committees, still less about their proliferation, and if I say that we have something like 120 advisory committees your reaction may be one of horror rather than admiration. When I say the standard structure of those committees is to incorporate representatives of trade and employers' associations, trade unions, professional bodies, technical colleges, the Ministry of Education, and anyone else who has a concern in a particular subject, I think you may agree that we have there a mechanism which ought to be pretty responsive to pressures from both the industrial and the educational sides. If it is not so, perhaps the fault is in the nominating bodies. I make that remark with great trepidation, seeing in this hall several members of the City and Guilds advisory committees, but I have been rather surprised when going into works or even colleges to hear criticism of City and Guilds examinations schemes from which I deduce that somewhere in the structure of industry, and to some extent of technical education, people are not always taking advantage of the representation that we offer them through this advisory committee structure.

Now the job of the advisory committee is primarily to find out what the problem is according to its particular subject; what sort of man is being trained, what does his job involve, what is the appropriate further education content of any course that should link up with his industrial training and apprenticeship. This survey is going on all the time, not only in new schemes, but also periodically in existing ones because the ground is shifting under our feet. The traditional material of the colleges was very much the keen, self-selected man who was usually concerned with the future and possible promotion, generally speaking, rather than the job in hand. In the last ten years the technical colleges have had to cope with the new situation created by the part-time day-release student who comes to supplement his industrial experience with a view to improving his competence in the job he is doing at the

to extend and administer the various systems of English apprenticeship. But such organizations have existed for a very long time on the Continent. There is, for example, the *Chambre de Métiers* of France, a compulsory organization for all employers and journeymen in the rural or small trades. It is a compulsory organization, extending over the whole country and administering apprenticeship in the crafts such as bakery, confectionery, boot and shoe repair, and so on. There is the *Industrie- und Handelskammer* of Germany. In Holland there is the Joint Apprenticeship Council, operating for each industry with co-operation from the technical branch of the Ministry of Education. There is the famous Statistical Bureau in Paris, which tries to gauge the needs of industry in five years time and to adjust the numbers entering the *centres d'apprentissage* to accord. The result is that the placement figures from the *centres d'apprentissage* of those going into the trade for which they were placed are as high as 95 per cent.

Then there is the moral element. In Holland a very active interest in technical education is taken by all the religious organizations. I was encouraged in Germany to see the work of the Y.M.C.A. and others in providing youth hostels, and the real work of liberal education, and moral character-building of apprentices, in the Ruhr steel industries, and in other works. How much do we accomplish in that direction? Are youth hostels used here as part of the moral and liberal education of apprentices in this country? How much of juvenile delinquency is due indirectly to adult delinquency—I do not mean delinquency in the sense of crime, but in the sense of failure to face some of these problems and to do as well for our apprentices as is done for some, but not all, apprentices elsewhere. I do not know the answers to those problems, and I put them as questions. I only know that a great deal remains to be done, but that if we can continue the good work of the Carr Report there is no reason why the quality of apprenticeship in this country should be second to any in Europe.

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moment; and it is for that reason—not because we are in any way ashamed of the older established City and Guilds scheme—that you have seen, in the last year or two, the great development of new City and Guilds courses, such as the Mechanical Engineering Craft Practice scheme and the various operatives courses. We have been very careful not to debase the standard of the older established subjects, because we are advised by industry that although subjects like machine shop engineering are of a high standard, and not suitable for everybody, they are fulfilling a vital function and should remain as they are. So we have adopted the policy of maintaining our standards in things like that, and of producing completely new courses devised from first principles to deal with the new problem of the part-time day-release man.

By definition, I am afraid we tend to get from the industrial side the forward thinker on the advisory committee rather than perhaps the average thinker of a particular industry, and there is a particular onus on the associations which nominate these members to disseminate their advanced thinking back through their associations and bring their members along with them. I was glad to hear so much said this morning about the rôle of the employers' associations and trade unions in this matter, because it is simply a case of trying to disseminate the factual information as widely as possible. It is surprising, despite all the reporting back and publicity, how so little filters through to the shop floor and the average small works. The function of the Institute is not confined to the commonly understood task of running examinations; it is also a unique forum for the exchange of opinion, information and the working out of solutions to problems, more particularly in the field of craft education. Those of us on the administrative side are very concerned that every industry which can make use of the Institute's facilities should do so to the full.

I would, in closing, assure Mrs. Oliver from West Suffolk that we have heard not only of catering but also of agriculture, and we have some very considerable developments in hand in those fields at the moment.

PROFESSOR LADY WILLIAMS (Department of Social Studies and Economics, Bedford College): As I am an economist from London University I feel that I should first of all apologize for being here at all, because I realize that I have not the practical experience that all of you have. Nevertheless, I have for some time been inquiring into the recruitment to skilled trades, and it is on the basis of the results of that inquiry that I want to put a certain number of suggestions before you.

I enjoyed Mr. Old's bracing and vigorous speech so much that I hope he will forgive me and not think that I am ungrateful if I am rather critical. When I was invited to come to this conference (and I am extremely sorry that I could not be at the morning session) I was hoping from its title that I would hear rather more radical proposals than I have heard put forward so far. There is prevalent an assumption that what has been, must continue, but that it should be trimmed at the edges and improved here and there; for example, that when you say you have a joint advisory committee it really should be joint and really should advise. But in general it is assumed that the pattern of apprenticeship should remain as it has been for so long, and it is that which I want to question. I am wondering whether we have not ignored the really great differences which have been introduced into the post-war world as a result of changes in both industry and in education. In industry we have to reckon on the fact that the apprentice is not really cheap labour any longer, as he used to be, that there has been a very great rise in adolescent wages, and that with the cost of day release the apprentice is very often a burden on the firm and not an asset to it, except as a long-term investment. It seems to me, therefore, that it is of no use for us to wag an admonitory forefinger at employers and tell them they ought to be prepared to train boys, that they ought to remember the future and be prepared to take on apprentices, even though the cost of training is so heavy for the small

or the moderate size firm that they are really unwilling to undertake it. Does this not suggest that we have got to look for other ways of training young people?

The second thing that I want to suggest is that since the very big development of public educational facilities the young people who come into industry now are different from what they used to be. The highly intelligent boy who, because of financial difficulties could not go on to a grammar school, can now do so, and that means that the boy who leaves school at 15 on the whole is somewhat less intellectually endowed, and this is likely to be even more the case in the future when a larger proportion of working people take advantage of the facilities offered them. That being so, we have to provide a rather different form of education for the boys who become apprentices. The kind of classes that were quite appropriate in the past for the intelligent craft apprentice who voluntarily went to them in his own time are probably on a much too high level for the boy who is compelled to go as one of the conditions of his apprenticeship, and who is anyway probably drawn from the less intellectually gifted. Therefore one has to reckon that the wastage is something that is likely to be permanent, and I strongly support Dr. Frisby's point that we ought to recognize that a very large number of the courses that we ask craft apprentices to take provide a higher standard of education than is really required for the job we are going to ask them to do.*

Then the development of industry: I know there are still an enormous number of highly skilled jobs, but there are also a large number of semi-skilled ones, and a great many of those, because of long tradition, have got listed as skilled jobs so as to carry the skilled rate, which means that the person doing them must have the five years apprenticeship and all that that entails. The fact that that training is not required is evidenced by what I encountered so often during my inquiry; both employers and the principals of technical colleges said to me constantly that many boys who had tried but consistently failed in the examinations were nevertheless grand craftsman, doing a fine job of work. Well it seems to me that if they are grand craftsman and they persistently fail in the theoretical work, then they are being asked to do what cannot really be an essential part of their training. We ought to be considering now a very much more radical examination of the structure and methods of our apprenticeship; what kind of theoretical education is really needed, and so on. I should like to suggest that we should remove 'training for skill' completely from the indenture to an individual firm, and run it by means of a joint body composed of the two sides of industry and the technical colleges, and have apprentices apprenticed to that joint body and not to an individual firm.

MR. D. A. COLLIN (Department of Psychology, Birkbeck College): I should like to follow up what Dr. Frisby said, and also in part what Lady Williams said, and make a plea for an examination of the techniques that we have all been talking about this morning and this afternoon. I should like to see a continuous study made of the essentials upon which methods of apprentice training are based.

Remember the emphasis that has been laid by speakers from various fields, Mr. Green and Mr. Howard, Mr. Sapper and Mr. Woodbine Parish, on the importance of theory in training apprentices. My studies in the Department of Psychology have to do with human performance, a wide field, and I wish to extend the penetrating point made by Dr. Frisby. A specific field of occupational psychology is vocational guidance, and one aspect of this study which is really applicable here, I think, is the study of vocational maturity. Some have said that apprentices would be better off leaving school at 16; others in industry seem to suggest that 15 is a better age—surely the variation is one which requires careful study? At Birkbeck College, as Ministry of Labour members will know, Mr. Alec Rodger runs a training and

* For another view of the relationship between apprenticeship and school courses, since received from Mr. Herbert P. Williamson, see Appendix on p. 859.

refresher course for Youth Employment Officers and also helps in their training in one of the centres in Surrey. Youth Employment Officers are closely concerned with advising young men and women as to what occupation will suit them and what is available. Their success depends upon the validity of the judgements they are able to make about the school-leavers. Since these judgements are based on standardized methods of assessment as well as experience, these methods should be continually under review.

The next step in a career is being selected for a firm, and obtaining satisfactory workers depends on selection techniques. Now again I must emphasize the importance of questioning these techniques. In a company in Italy and France I understand (from the personnel manager) that selection procedures for operatives last eight hours. This may seem exorbitant—it does to me, but do we take enough time to consider our techniques of selection? Do we consider whether the interview is doing what we want it to do, whether our tests are doing what we want them to do? This of course depends upon what basic skills we are to investigate. This is essentially the point made by Dr. Frisby: that the skills may in fact be very different for different jobs. For example, there is a study going on at the college at the moment on inspection tasks. Now how are we going to select for an inspection task? Are we going to use exactly the same technique as we would for clerical tasks or for people in the Services? How are we to select people for controlling the automation machines—in fact how are we going to select Lord Nathan's automatic chauffeur which he claims will take the place of his ordinary human chauffeur in future?

My next point concerns the design of equipment: everybody knows that engineers design equipment. This was found to be the case during the war in the design of a tank, which was so efficient that by the time it got to its target all the people inside were dead because it was so hot! This is a rather ruthless example, but what we need in fact is a combination of engineering 'know how' and knowledge from the psychological point of view to produce efficient *and* workable machinery, that is, both disciplines need to combine in research on design.

Then there is training itself. Everyone has been talking about training methods. What is the validity of our training methods? Is our method producing the men we want. I noticed in the E.I.A.G.A. pamphlet that 'Opinion on progress and potentiality of the apprentice is compared at the termination of his course'. Now what sort of assessment is being made here? Who makes it? How does he make it? Is it reliable? You must always question the reliability of individual judgements, for they are so susceptible to error. Study of the techniques of assessment and refusal to accept that there is ever a 'best' or 'only' method is the way to ensure that the assessment keeps alert to variation in training and success.

However, there are only limited facilities for research in the universities; there is my own college, there are Liverpool and Edinburgh, Cambridge and Bristol. Nevertheless, it is most important to remember that we are all 'apprentices' in the study of human performance. We must therefore continually question our methods and the results of these methods. My final point is the one I began with: that adequate theory is necessary for us as well as for the apprentices who are in training.

MR. A. I. FISHER: I am here as a member of the Society, but I am here also as the Principal of Redhill Technical College. I believe that we must pay more attention to setting students on to the right courses, but I am also sure that the worker believes that the measure of his value is his pay packet. One of the greatest things that we might look for in co-operation between technical education and industry is to see whether there might not be some impact on the pay packet from success in technical education. At the moment the intelligent student knows quite well that if he gets all his qualifications he may have a better career in the future; but if you are 17 and you are, for example, buying a motor-cycle by hire-purchase, then the chance of an extra

halfpenny an hour or whatever it is, next year, if you pass your technical college examinations, will make you sweat blood in order to do so. I think that might well be looked into. The other point that I should like to raise is that where good craftsmanship is still an essential part of a man's trade, we might well require him to possess some samples of craftsmanship made during his apprenticeship. That does happen in some industries but not in all. In a certain Hackney museum you will see tool boxes made during their apprenticeship by craftsmen in the furniture trade in the eighteenth century. When their apprenticeship was finished they put their tool box on a barrow and took it round to the employer and said, 'This is me. Can I have a job?' That day has not gone, and people in some trades might be asked to have a few samples of their craftsmanship.

MR. K. COATES (Head of the Department of Engineering and Management, Harrow Technical College): People seem to have forgotten the material that we have to deal with, namely the apprentice. They have been saying much about the various courses and ignoring what seems to me to be one of the most prolific causes of the so-called wastage: that you are not getting your students into the right courses when they start. To a great extent I blame industry for this, because they are saying that a boy is good enough for the National Certificate course when he is not. He has not enough background, and quite frankly, looking over the results of National Certificates that I have just been doing, and on the basis of some 200-odd students in this one year, I think that the bulk of the people who have been successful have had a grammar school background. It is the exceptional boy from a modern school who has been able to get as far as the Ordinary National. If he has, he has had a hard struggle. A lot of boys like this, the so-called wastage, would have been good craftsmen, and had they taken the City and Guilds courses or some other course of a lower standard than the Ordinary National, would have been regarded as successful. A lot of these lads, as has been suggested, have actually lost heart because they failed. They have been tried too high. Somebody somewhere has got to make some form of real selection at the early stage.

If you start with all your entrants having had full-time education up to the age of 16, then you are getting somewhere. In Harrow, as some of you may know, there is the very sound scheme known as The 'Harrow Schools Leaving Certificate' (for boys who have taken an additional course at modern secondary schools) which is worked in conjunction with the college. The college staff actually do the assessment and moderation of the papers set by the staff of each of the participating schools rather on the National Certificate scheme. Boys who have come through that scheme have made first rate National Certificate students. I have just had one who has passed out on his first attempt at Higher National, having gone straight through the course.

MR. D. A. G. REID (Principal, Brixton School of Building): I feel that my beliefs as to the relative positions of the colleges and industry in respect of training must be rather different from those of many of the speakers who have spoken this afternoon. I believe that training is done in industry. You do not make a bricklayer in a technical college, and the same applies over a wide range of industrial occupations. I think a good many of the criticisms to-day arise from the belief that we shall do what amounts to training in educational institutions. I do believe, however, that the study which a young apprentice undergoes in a technical college contributes very greatly to the training, and that it forms a very necessary part of his life at that sort of age; and if his course of study is to be successful then it must be based on appropriate teaching material. The young craft apprentice is most likely to react to teaching material which is closely related to his craft, and that in my mind is the importance of the workshop in the technical college. It is not the place where the finest parts of carpentry or joinery are taught to the young carpenter or joiner, it is the place where his interest in technical college study is most likely to start and from which his

interests in other parts of his course are most likely to develop. Basically we are interested in encouraging him to read, to write, to calculate, to draw and to think—that is our function in this whole business, his further education. I was a little surprised when Lady Williams said that some of our products are too highly educated for the job they have to do. If she meant too highly trained I think she should have said so. On the building side we have kept our craft courses relatively healthy at a time when unfortunately, in engineering, education craft courses were allowed to die or nearly to die, and the revival of craft courses in engineering has been a very serious problem in post-war technical education. On the building side we have craft courses with three possible points of entry, and we have the National Certificate courses with two possible points of entry, and, while I would admit that we do not consciously select people for courses and for appropriate points of entry with anything like the care we should, in fact it is like a golf course with a lot of points at which you can start—it does work quite well.

The wastage in many respects seems very serious, but there is, as many of you will know, a new set-up for building craft courses being devised by the City and Guilds of London Institute. To my mind, the most important way in which the new set-up will differ from the old will be in the Craftsman's Certificate Examination which is likely to replace the old Intermediate Examination; in that new examination it will, I hope, be possible to compensate for a bad theory mark by a good practical mark to a much greater extent than has been possible in the past. In the past the theory mark for a pass has generally been set at 50 per cent, and while compensation of marks below 50 has been permitted on account of good practical marks, in general the theory marks have seldom been compensated, given a normal distribution of marking much below 47 per cent. I think we may in the future be able to arrive at a position where, on a comparable standard of marking, we shall compensate theory marks of 40 per cent and possibly a little lower, and I believe that that will have an encouraging effect on many of these young men. From what I have seen of building apprentices during the last ten years, I should say that it should be possible to get up to 85 per cent through that Craftsman's Certificate Examination, I mean 85 per cent of the group that continue in apprenticeship, because a surprising number of indentured apprentices do fall out of apprenticeship and, therefore, out of part-time day attendance at technical colleges. For those that remain, my experience has been that, given careful supervision, it is possible to raise the number sitting the present Intermediate Examination to about 75 per cent, and I believe that the figure could be raised still further. But what is needed to raise it is very close supervision of the student's course, both by the college and by the employer. If the apprentice shows signs of lagging in his early stages, whether it is by missing attendances or by lack of progress, that point should be picked up by the college, and taken up by the employer. This would result in a great many apprentices, who at present go steadily down the hill and probably fall out of apprenticeship, continuing to train satisfactorily.

MR. A. WOODWARD (Regional Officer, British Productivity Council): I am grateful for this opportunity to speak again because I think we are getting a little away from the subject of to-day's meeting. We came here to find out what could be done to stimulate the smaller firm to play its part in training. We have complained that nobody knows what everybody else is doing. The small firms do not know what the technical colleges have to offer, the technical colleges do not know what the secondary schools are doing and the standards that they are aiming at. Secondary schools do not know what the technical colleges demand. My Council is a platform where these things can be aired. We will continue to bring together everybody who is concerned in this business of industrial efficiency, and surely training at the very beginning goes to the root of the whole of this business.

The Productivity Committees in Surrey have combined to do something about this. Last year in May they held at the Technical College at Ewell an all-day conference about 'Grammar Schools to Industry' to consider what industry wanted from secondary school pupils. That produced what I believe is the most important little book that has ever been published for the use of people in schools, because it sets out quite clearly, in about forty pages or less, the information as to what standards are necessary for further education in each industry, and where that education can be found in the county. This year a similar conference was held for secondary modern schools. I am quite sure that the Surrey Education Authority (and I believe that Mr. Leach from that authority is present) would be quite pleased to show people and your Council the approach they have made to this problem. They have also, at Kingston-on-Thames, through the Productivity Council got a register of firms which are prepared to take people from secondary and further education into industry for experience, and they are prepared to take people from industry into schools through this joint committee. Such committees are not applied in other regions of the country. I believe, from to-day's conference, that similar attempts must be made all over the country. We have, as I said earlier, over 100 local organizations. One in each county could very well sponsor a meeting of this nature. We must be able to explain to the small man what is involved in training, and show him what is available if he will only undertake that training. If I may particularize on two small points. The Brighton Education Authority have gone some way to solving the problem of what to do with the good craftsman who cannot keep up even with the City and Guilds—the man with his skill in his hands. They have a course which runs for the last three years of apprenticeship, assuming him to fail his intermediate at the age of 18. I believe that that would be worth your examining.

I would sound a warning to some people in education who think that industry wants its craftsmen from among the 'A' level boys from the secondary modern—it does not. They are going too far. Certain firms, examining what craft apprentices they had in training for the last ten years, found that roughly 12 per cent have remained craftsmen, and the rest have gone up the ladder because they have set their recruiting sights too high. And indeed one firm now recruits what it calls 'the illiterate plus', but they remain as craftsmen.

We were asked this morning about the cost of training an E.I.A. apprentice. It is 200 guineas for five years, a figure which I think should be given.

MR. E. L. G. ROBBINS: The cost of training is in the published brochure, but you have not had a copy of it. A fee of £5 to cover once-for-all registration is charged to a firm joining or supporting a group, either with or without apprentices. We have some large firms which have paid the £5 registration fee and get our literature, and which help us to develop the scheme. That goes for all the firms, large and small. The only other charge is £42 per annum per apprentice. That charge is calculated to cover our costs, and no more, on a basis of 60 apprentices in each group. We have not yet reached that, and so far we still have some backlog of costs to make up.

THE CHAIRMAN: I have been listening all to-day, as you have, to a variety of statements from a variety of speakers with a variety of experience. It is very difficult to find a theme common to all the statements. I myself am not closely concerned with industry; I have been for many years as might be said an 'onlooker' and have made my living out of industry, and yet I have scarcely been a participant. I have come across a great variety of people and concerns engaged in industry.

One impression that has been made upon me to-day as a result of this discussion, and of some observation outside, is that I am far from satisfied that this is in the main an industrial problem at all. I think it is in the main an educational problem, and many of the difficulties which have been referred to to-day will be solved and disappear like mist in the sun of a September morning, if we once raise the age

for leaving school to 16, or, as in certain countries on the Continent, in Russia and in the United States, to 17 or 18. As Lady Williams said, there is very little relationship between the intellectual standards of those who are called upon to take examinations and tests, and the examinations and tests which they are called upon to take. There is also taking place, at an ever increasing speed, a rapid change in the form and structure of industry, and we really have to face entirely new problems. To-day the impression made upon me is that we are looking backward instead of looking forward: working upon the experience of the past instead of the possibilities and the likelihoods and even the certainties of the future. At best we are standing still when we ought to be moving forward.

I agree with a great deal that was said by Mr. Woodbine Parish, especially on the question of publicity. That is one of our great problems—in every variety of activity to bring to the knowledge of the people concerned the things that are happening and in which they ought to be interested. The great problem is to create a climate of opinion. There I agree with Mr. Woodbine Parish. Where I venture to differ from him is in the formation of yet another committee. I should like to see a sabbatical year or even years for the formation of committees. When a man cannot make up his mind, he says, 'Let us refer it to a committee'; where he is too busy to give the proper attention to the subject he says, 'Let us form a committee'. A committee means an organization; it means the publication of a report which has to be prepared, discussed, printed and circulated, and mostly goes into the waste paper baskets of its recipients. Those who attend these committees are mostly the same people time after time, only under different names! And I believe that one of our chief objects should be to bring realism to the committee system. If we were to bring an element of realism to the committee system, you would find there would be far fewer committees than there are now, and a great deal of time that is now spent in discussion would be spent in doing the things which the committees are designed to foster (rather than so much talk). Committees in the main are apt to be not instruments of progress, they are a rampart against it. This does not mean that I do not think this conference has been worth while, because I certainly think it has, it has brought together a number of people who have a common interest.

I think, however, a weakness, if I may say so, of the conference has been that the experiences which have been related to us are mostly drawn from London and indeed from the large firms in London. The experience of the smaller cities (small in relation to London) and the firms outside are I believe very different. Many of the problems of which we have heard to-day are not problems that extend to every part of the country or to industry as a whole. They are, if not limited to London, at least most persistent and most definitely observable in London. We are apt, therefore, to get an exaggerated and distorted view of what the problem actually is. I do not believe it is anything like as difficult as some of our speakers seem to have contemplated.

In the end, however, we shall study everything that has been said to-day with a dispassionate mind in the hope that something may emerge which will be concrete and helpful. You will then have the satisfaction of knowing that—without another committee, I hope—something has emerged that may lead in a positive sense to action.

The Chairman then thanked the principal speakers for their contributions to the Proceedings, and the delegates for attending the Conference.

SIR HAROLD SAUNDERS (Chairman, Conference Committee): I am sure you would like to express your thanks to Lord Nathan for taking the Chair to-day. I speak as chairman of a committee which had some realism about it, and put up to the Council of the Society the proposal that there were certain matters in the Carr Report in which the Society might help by having a conference. I also speak as a former member of the City and Guilds College in South Kensington and as a member of the City and Guilds Institute, so naturally I was most interested to hear what has been said

about the Institute and its examinations. When the Organizing Committee was considering the procedure for the conference to-day and possible chairmen, we were delighted that Lord Nathan agreed to our suggestion that he should take the Chair. We know how busy a man he is, and we were very glad to know that he would give us the benefit of his experience and skill. I expect most of you know that the craft in which our Chairman was apprenticed was the craft of the law. I am sure we would agree that he must have been a most assiduous apprentice and that he was well taught.

The vote of thanks to the Chairman was carried with acclamation, and the Conference then ended.

APPENDIX

We have received from Mr. Herbert P. Williamson, Headmaster of William Morris School, Walthamstow (who was unable to attend the Conference), the following comments on the relationship between apprenticeship and school courses:

'I feel the whole question of the relationship between apprenticeship and school courses needs to be reviewed. Many of the apprenticeships are unnecessarily long for other than the duller of the boys following them.

The way some of the agreed schemes are operated . . . is in many cases at present in the interest neither of the industry nor of the pupils attending grammar or technical schools. I think it would be very reasonable indeed to expect a reduction—in some cases a very considerable reduction—in the length of apprenticeship to be agreed to boys from grammar or technical schools or from similar streams in . . . the comprehensives, who have reached reasonable standards in some technical subjects appropriate to the particular trade or industry.

I [have been] reading through the Indentures of Apprenticeship of my father and grandfather, and I feel that industry has, in the main, adopted the admirable idea of apprenticeships with its obligations on the part of both employer and apprentices to changing needs. Personally, I think there is room for both the craft and the student type of apprenticeship. Both of these kinds are working well, though . . . I do think that constant scrutiny is necessary to ensure that the full possibilities of agreed schemes are in fact the ones usually operated and that the length of the apprenticeship be reduced for boys and girls who have successfully followed certain courses which would be helpful to them'.

[The members of the Organizing Committee of the Conference were: Sir Harold Saunders, F.C.G.I., B.Sc.(Eng.) (*Chairman*); The Honble. G. C. H. Chubb; Mr. A. R. N. Roberts; Mr. H. A. Warren, M.Sc.(Eng.), M.I.C.E., M.I.Struct.E.

The following firms and organizations were represented:

Acton Technical College; Amalgamated Engineering Union; Amalgamated Union of Building Trade Workers; Association of Engineering and Shipbuilding Draughtsmen; Babcock & Wilcox Ltd.; W. P. Banks Ltd.; Charles Barratt (Shopfitters); Battersea College of Technology; Birmingham Aluminium Casting (1903) Co. Ltd.; Birmingham Small Arms Co. Ltd.; Boots Pure Drug Co. Ltd.; Borough Polytechnic, S.E.1; Bovis Ltd.; British Association for Commercial and Industrial Education; British Association for the Advancement of Science; British Employers' Confederation; British European Airways; British Productivity Council; British Transport Commission; Bromley Technical School for Boys; Buckingham & Sons Ltd.; Cammell Laird & Co. (Shipbuilders and Engineers) Ltd.; James Carmichael (Contractors) Ltd.; Christopher Wren School, W.12; City and Guilds of London Institute; Coopers Mechanical Joints Ltd.; Cordwainers Technical College; Cox Brothers; Cray Valley Technical School for Boys; Crosse & Blackwell

(Holdings) Ltd.; Croydon Secondary Technical School; Croydon Technical College; Department of Scientific and Industrial Research; James Drewitt & Son Ltd.; Dunlop Rubber Co. Ltd.; Ealing Technical College; Electrical Trades Union; English Electric Co. Ltd.; Esso Petroleum Co. Ltd.; Ewell County Technical College; J. W. Falkner & Sons Ltd.; Howard Farrow Ltd.; Fisons Ltd.; Ford Motor Co. Ltd.; Forest Hill School; M. & F. O. Foster & Co. Ltd.; Gas Council; Gravesend Technical College; D. A. Gunn (Engineering) Ltd.; Harrow Technical College and School of Art; Head, Wrightson & Co. Ltd.; Hendon Technical College; H. J. Heinz. Co. Ltd.; W. T. Henley's Telegraph Works Co. Ltd.; Hertfordshire County Council; High Wycombe College of Further Education; Hilger & Watts Ltd.; Holland & Hannen and Cubitts Ltd.; Holliday & Greenwood Ltd.; Holloway Brothers (London) Ltd.; Walter G. Holloway & Son, Ltd.; Imperial Chemical Industries Ltd.; Industrial Administration (R. & A.) Ltd.; Institution of Civil Engineers; Institution of Electrical Engineers; Institution of Mechanical Engineers; Isleworth Polytechnic; Kent Education Committee; Killby & Gayford Ltd.; Kodak Ltd.; Kynaston School, N.W.8; London County Council; London Master Builders Association; James Longley & Co. Ltd.; Joseph Lucas Ltd.; Sir Robert McAlpine & Sons Ltd.; R. Mansell Ltd.; Middlesex County Council; Ministry of Education; Ministry of Labour and National Service; Ministry of Labour Women's Sub-Committee (Eastern Area); Ministry of Supply; Muirhead & Co. Ltd.; Mullard Ltd.; National Coal Board; National College of Food Technology; National Institute of Industrial Psychology; National Society of Painters; National Union of Tailors and Garment Workers; North-Western Polytechnic, N.W.5; Nuffield Foundation; Paddington Technical College; Pearce Bros. Builders Ltd.; Peel Park Technical College, Salford; Phosphor Bronze Co. Ltd.; Plumbing Trades Union; Poplar Technical College; Post Office Engineering Union; Rawlings Bros. Ltd.; Reading Technical College; Albert E. Reed & Co. Ltd.; Regent Street Polytechnic; Rolls-Royce Ltd.; Gordon Russell Ltd.; Shell Refining Co. Ltd.; Siemens Edison Swan Ltd.; Sir John Cass College; Slough College of Further Education; Society of British Aircraft Constructors Ltd.; Society of Lithographic Artists, Designers, Engravers and Process Workers; South-West Essex Technical College; Stanton Ironworks Co. Ltd.; Steel Company of Wales Ltd.; Surrey County Council; Tate & Lyle Ltd.; Taylor Woodrow Services Ltd.; Tensometer Ltd.; Tottenham Technical College; Trades Union Congress; Vickers Ltd.; Walsall Foundry Trade Joint Recruitment and Training Committee; Wandsworth Technical College.

The following individuals also accepted invitations to take part in the Conference:

Mr. D. P. Barritt; Miss L. Bristowe; Mr. Stanley Colkett; Mr. Charles H. Easton; Mr. A. I. Fisher; Sir Ernest Goodale; Mr. A. C. Hartley; Mr. A. Hibberd; Mr. John E. Jeffrey; Mr. Edgar E. Lawley; Mr. L. S. Pendlebury; Mr. R. Slattery; Mr. N. C. Stamford; Mr. J. Arnold Waith; Mr. C. E. H. Watson; Mr. Maurice Willis; Mr. W. J. Woolgar.]

EXPANDING HORIZONS IN ORGANIC CHEMISTRY

The Sir William Jackson Pope Memorial Lecture by

SIR IAN HEILBRON, D.S.O., F.R.S.,

Professor Emeritus, University of London, delivered to the Society on Wednesday, 14th May, 1958, with Sir Eric Rideal, M.B.E., F.R.S., in the Chair

THE CHAIRMAN: We are here to commemorate the name of Sir William Jackson Pope. There may be a number of people in this room who remember that tall, rather oriental-looking figure in a frock coat walking about the University of Cambridge; or they may have seen him with his housekeeper, Miss Herbert-Little, under the largest Catalpa tree in Cambridge, having afternoon tea; or with his wonderful collection of pestles and mortars, or with his collection of early alchemic prints. Those who did not know him socially have at any rate learned of his skill in the science of chemistry, possibly owing to the very fortunate fact that he was interested at an early date in crystallography, and with Barlow published a great deal of work on the packing of the atoms. Pope was always intrigued by the asymmetric carbon atom, and owing to the rather fortunate discovery of a strong optically active acid, β bron π camphor sulphonic acid, he was in a position to extend the work of Pasteur to other asymmetric atoms, sulphur, selenium, tin and so on, and later on, of course, he was attracted by the work of Le Bel and Van't Hoff, and was always seeking those asymmetric systems which had no plane of symmetry.

Not only was Pope interested in stimulating chemistry in Cambridge, but he was one of the great founders of the International Union of Chemistry, and whether one saw him eating octupus in Madrid or red caviare in Budapest, or taking part in the Solvay Conference in Brussels, one was always assured that it would be a successful meeting. Apart from those international activities he did a great deal for the country. Not only did he show that the Government could save a good deal of money by making toluine from the crude oil of Trinidad instead of buying it by manufactured process, but he was also, as you know, interested in the synthesis of mustard gas as well as in a number of other immediate Government contracts. He saw no difference between what is called academic and industrial chemistry—a thing which is very much desired even at the present time. He was interested in artificial silk, and indeed a number of people may remember that he was also interested in various types of cold cures! This afternoon I have the greatest pleasure in introducing a man who, I think, combines all those great advantages and merits possessed by Sir William Pope—Sir Ian Heilbron.

The following lecture was then delivered.

THE LECTURE

I should like, in the first place, to express my sincere appreciation of the honour you have done me in inviting me to deliver the Ninth Pope Memorial Lecture.

Various aspects of Sir William's life and work have been examined by past lecturers. Thus the late Dr. L. H. Lampitt spoke of the great part he played in

the creation both of the Federal Council of Pure and Applied Chemistry, a forerunner of our present Chemical Council, and of the International Union of Pure and Applied Chemistry. Again, Dr. F. G. Mann discussed Pope's unique contributions to stereochemistry, while Sir Owen Wansbrough-Jones elaborated on his work in the field of chemical warfare. There still remains one facet of his many interests that has not been specifically covered by any of the previous lecturers. I refer to his deep concern regarding the position of chemistry and the part which it was destined to play in Great Britain. His views after the termination of the First World War were both grave in his appraisal of the existing deficiencies at that time and incisive regarding how these deficiencies might be remedied. In the course of his Presidential Address to the Chemical Society on 27th March, 1919, entitled 'Chemistry in the National Service', he points out that 'one of the recognized duties of the spokesmen of science during the past sixty years or more has been that of endeavouring to bring home to the general public and to its administrators the danger of neglecting the cultivation of pure and applied science'. He goes on, 'The coming struggle for scientific and industrial position, on the results of which must rest the whole intellectual, artistic and material future of our race, will call for longer, greater, more persistent and more intelligent effort than any which we have hitherto exerted.'

In order to appreciate why Pope deemed it necessary to deal at length and in such strong terms with this subject and, indeed, why it is necessary to return to it to-day, we must briefly examine the position of organic chemistry in this country prior to the outbreak of the First World War in 1914. The rise of the fine chemical industry dates from 1856 when Sir William Perkin, at that time a student of Hofmann at the Royal College of Chemistry, fortuitously discovered at the age of 17 the first synthetic dye, mauve. It was this discovery which laid the foundation of the vast organic chemical industry which in our days has become so diversified as to embrace not only synthetic dyestuffs, but also pharmaceuticals, fibres, plastics, detergents, insecticides, photographic and perfumery chemicals.

As mauve was shown by Mr. Pullar of Perth to be a good dye for silk cloth, the youthful Perkin, with determination and courage, and helped by his father, started a factory at Greenford Green which, under the name of Perkin and Sons, commenced the manufacture of the new colouring matter in 1857. This factory achieved great success, and many synthetic coal-tar dyes, including alizarin, were produced in it up to 1874, when the works were sold following Perkin's decision to return to academic research. Even at this date, however, there were signs that the British colour industry, based on coal-tar, was on the decline. This was partly due to the failure on the part of our manufacturers to appreciate the rich rewards inherent in developing the coal-tar industry and partly to the fact that, as a result of the general neglect of organic chemistry in our universities at that time, we lacked the trained chemists required for the prosecution of research, a prerequisite of all scientific discoveries.

The vast possibilities of the new industry were, however, quickly recognized in Germany which, with its vigorous schools of organic chemistry, was in a

particularly favourable position to ensure its rapid extension. So much was this the case that by the beginning of the present century, from which date my personal interest in chemistry stems, the fine chemical industry was essentially in German hands. Even the organic chemicals we used in our universities were imported from Germany, including simple solvents such as absolute alcohol, acetone and light petroleum hydrocarbons. To some extent, as, for example, with regard to many fine chemicals and facilities for carrying out micro-analyses, this situation was maintained right up to the outbreak of the Second World War.

So far as I can recollect, neither the successive Governments of the day nor our industrial leaders were in any way perturbed by these happenings, for Great Britain sixty years ago was still the most prosperous country among the great powers and the future seemed sufficiently secure. Our prosperity had, however, really been based on the application of steam and electrical power to the manufacture of iron and steel, with all that that entailed in industrial expansion both at home and overseas. Perhaps for this reason the many spectacular discoveries being made in chemistry and physics, such as the discovery of radio-activity and of X-rays, the isolation of radium and the separation of the rare gases of the atmosphere, received but scant public attention. And so we move on towards the First World War, and we can note with interest on the industrial front a new and important British advance on the road to man-made fibres in the commercial production, by Courtaulds Ltd., at Coventry, in 1905, of viscose, a semi-synthetic reconstituted cellulose based on wood pulp, a process owing its origin to the work of Cross and Bevan in Manchester in 1892. During the first years the output of yarn averaged 150,000 lbs. per year, but this industry has increased to such an extent that in 1956 it would appear that the output of viscose yarn in this country reached some 70 m. lbs., while in the United States output was nearly 500 m. lbs. of yarn, textile and industrial. Other technological landmarks of this period were the setting up in 1909 by Joseph Crosfields in Warrington of the first plant for the hardening of liquid fats and the production in America of bakelite, the first of the thermo-setting resins. Again, mention may be made of the pioneering efforts of W. H. Perkin, Jnr., Pope, Weizmann and Fernbach to produce synthetic rubber. Although commercially premature, it led Weizmann in 1911 to a process for the manufacture of acetone together with butyl alcohol by the fermentation of carbohydrates. This was to prove of supreme importance to this country in the coming war, as acetone was an essential solvent in cordite production.

Despite these individual achievements, the outbreak of war in 1914 found this country in a position of unparallelled danger, and complacency was quickly dispelled when the full significance of our neglect of the organic chemical industry became realized. The total dependence of our great textile industries on German dyestuffs became immediately apparent. The position was very similar with other fine chemicals, where even simple pharmaceuticals such as aspirin and phenacetin and local anæsthetics like β-eucaine and novocaine were no longer to be procured. We had no manufacture of T.N.T. and here our supply of toluene was insufficient. Above all we lacked trained chemists to operate

plants, and chemical engineers with the knowledge how to plan plant construction. That we were successful in meeting many of our most urgent requirements was in no small degree due to the unceasing work carried out in the laboratories of our universities and technical colleges. In March, 1915, a Memorial was addressed to the Government by the Chemical Society. It pointed out that scientific research is the soul of industrial prosperity and attributed the backward state of the chemical industry in this country largely to the almost total want of sympathy and co-operation between manufacturers and workers in pure science. In the same month, the Royal Society submitted a similar Memorial. Governmental action was taken in July, 1915, when the Advisory Council on Scientific and Industrial Research was established.

Gradually order came out of chaos but, although the end of hostilities found Britain with the nucleus of a sound organic chemical industry, many of our manufacturers still failed to grasp their opportunities and were quite prepared to revert to pre-war conditions and continue to obtain dyestuffs and other organic chemicals from Germany. However, the importance of the industry as a vital factor in the future prosperity and defence of the country was eventually recognized and two Acts were passed through Parliament, namely the Dyestuff (Import Regulations) Act of 1920, and the Safeguarding of Industries Act of 1921, which provided a certain degree of protection to the youthful industry.

On the academic front, the accepted policy of successive Governments to assist the universities through the University Grants Committee and the Department of Scientific and Industrial Research, together with the establishment of the Ph.D. degree by the universities, went some way to further post-graduate research.

In Manchester, the dyestuffs factory of Levinstein Ltd., founded in 1864 and later to become the main research and industrial centre of the British Dyestuff Corporation, was, in the face of most difficult and trying circumstances, being developed under the able direction of Dr. Herbert Levinstein and his colleagues, and it was here that during the next 20 years some of the most striking developments in colour chemistry were made. I doubt, however, if we could have maintained a fine chemical industry in this country had not the British Dyestuffs Corporation, the Cinderella of the merging groups, been absorbed into the great group of heavy chemical companies which in 1926 amalgamated together to form Imperial Chemical Industries Ltd. It is my opinion that, without the far-sighted policy of expansion which I.C.I. has adopted ever since its inception, the outbreak of the Second World War could well have found us again devoid of a synthetic chemical industry based on coal-tar products, for there is little question that at this period we still had not awakened to the wide potentialities held out by the industry.

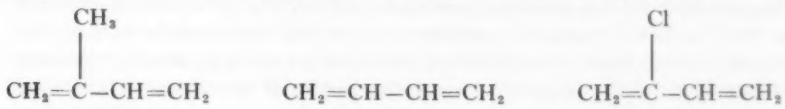
Beginning about 1930 organic chemists, with the aid of new techniques such as the Pregl methods of micro-analysis, chromatography and ultra-violet spectroscopy, were already elucidating the molecular structures of many complex materials elaborated by the living cell, and were effecting their syntheses. I refer here especially to the vitamins and sex hormones. This work was most

successfully advanced in Germany, Switzerland and America, countries in which chemistry held a high place and where the closest possible collaboration was maintained between the universities and industrial pharmaceutical laboratories. The more intimate and fruitful co-operation abroad quickly led to methods of manufacture and even to the establishment of new and important industries in which, through complete lack of foresight, Britain failed to participate to any large extent, despite the fact that our achievements in pure research were equal to those of any other nation.

In addition to dyestuffs and medicinal products, a further important factor contributing to the rapid development of the organic chemical industry was the quick growth, from 1900 onwards, of the automobile and aircraft industries. These created a continually increasing demand for more and higher grade motor spirit as well as for many novel requirements, such as plastics and synthetic fibres, rubbers and lubricants. It is interesting here to recall that acetate rayon was first used on a commercial basis during the 1914–18 war as a non-inflammable 'dope' for covering aeroplane wings, and a factory for this purpose, later turned over to the manufacture of textile yarn, was established by the Dreyfus brothers at Spondon.

In 1935 the first completely man-made fibre, known as nylon, was synthesized by Carothers in the U.S.A., from hexamethylenediamine and adipic acid, as a result of five years research on the polymerization of bifunctional molecules. It was first produced commercially by Du Pont in 1940. Another revolutionary investigation by this brilliant chemist was the somewhat earlier discovery in 1932 of the first American synthetic rubber, neoprene, obtained by the polymerization of chloroprene derived from vinyl acetylene. Although too expensive to compete with natural rubber as an all-purpose elastomer, its striking oil resistant properties and its stability against oxidation renders it a valuable material for many specialized uses, especially on aircraft and for fuel hoses.

An analogous achievement in the field of synthetic rubbers was the development in Germany of the Buna rubbers which reached commercial production in 1935. Unlike earlier attempts to reproduce natural rubber from its unit source, isoprene, the German process employed the simple straight chain hydrocarbon, butadiene, which is then co-polymerized either with styrene to give the all-purpose Buna S or with acrylonitrile to yield the more oil resistant Buna N.



isoprene butadiene chloroprene

Neither Britain nor the United States showed much interest in this development at the time because, having control of sea power, it was considered impossible that supplies of natural rubber from the Far East could ever be cut off. For Germany, however, the Buna rubbers closed one vital gap in her national defences, and by making use of her immense chemical industry she ensured for herself ample supplies of a rubber suitable for all general purposes in the event of

a complete naval blockade. The second major gap was petrol, and this was provided through the I.G. Farbenindustrie by applying the Bergius process of hydrogenation of coal. The first commercial plant was built in Leuna in 1927 to produce 100,000 tons of petrol per year from brown coal. Incidentally, I.C.I. had a similar plant at Billingham designed to use bituminous coal and creosote oil. This was started in 1935 and had a production capacity of 150,000 tons per annum. Another German development of about this period was the Fischer-Tropsch process for the manufacture of liquid fuels, whereby coal or coke was directly gasified in the presence of water-vapour to carbon monoxide and hydrogen, which was then converted by means of a cobalt catalyst into hydrocarbons boiling within both the gasoline and diesel fuel categories.

The outbreak of the Second World War in 1939 found this country generally in a satisfactory position to meet its immediate military requirements. It quickly became apparent, however, that new factories would have to be erected to cope with the growing needs of total war. One very important deficiency was carbide, in which Britain was probably the only country in Europe which had no home manufacture. Other deficiencies of course existed but fortunately, many of them could be made good at this juncture by direct purchase from America.

The destruction by the Japanese of the American fleet at Pearl Harbour in December, 1941, brought the United States into the war and so made certain an Allied victory. Before this was to come about, however, many dangers had to be overcome, and possibly none were greater than those appertaining to the maintenance of adequate supplies of war materials. The first result of Japan's victory in the Far East was the closing of all sources of natural rubber, and it became a matter of overriding urgency for the Allied nations to establish a synthetic rubber industry. That this was achieved in the United States within a year stands out as one of the greatest technical achievements of the war. At the same time it brought fully into focus the amazing potentialities of petroleum as a raw material for chemical manufacture. The catalytic cracking of petroleum under various conditions yields large quantities of gaseous hydrocarbons, notably ethylene, where production in the U.S.A. is now near two million tons per annum for glycol, ethanol, vinyl chloride, styrene, etc., propylene (800,000 tons for detergents, plastics, glycerol, acetone, phenols) and butylene. The latter hydrocarbon, together with butane, was used as the basis for the butadiene required for Buna S and by 1944 just on one million tons per annum of synthetic rubber was being produced, sufficient to cover the requirements of both the United States and her Allies. Although developed as a war-time security, synthetic rubbers have to-day acquired a versatility particular to themselves and have accordingly secured a permanent place in our peace-time economy. Something of the magnitude of this new industry may be gauged by the fact that whereas world production of natural rubber in 1956 amounted to some 1,900,000 tons, production of synthetic rubber of all kinds totalled no less than 1½ million tons. It is impossible to mention all the types of synthetic rubber now in production as the horizon is continually expanding and to-day many are 'tailor-made' for specific purposes. Thus quite recently there has been introduced on to the market

a new group of synthetic rubbers, known as the silicone rubbers, which are noteworthy on account of their response at both high and low temperatures and resistance to corrosive chemicals. Again, the problem of producing 'synthetic' natural rubber would appear to be reached by the use of special catalysts which orient the linear linking of the individual isoprene units in the required cis-1:4-configuration.

In Great Britain, domestic production of synthetic rubbers based on petroleum has now been started and it is planned to make up to 75,000 tons a year. Other European countries, such as Germany, Italy, France, Holland and Spain, are also planning production up to some 200,000 tons per annum of latex and rubber.

Apart from elastomers such as rubber, synthetic plastics based on petroleum have now become an immensely important factor in world economics and to-day supplant many of our traditional materials such as wood, metals, glass and ceramics. Their many special properties, such as lightness, chemical stability, oil and fire resistance, lead to a variety of new applications formerly beyond our reach. Something of the importance of this industry to this country is shown by the fact that in 1955 the output of plastics reached some 330,000 tons, more than double that for 1950, while in the U.S.A. the 1957 output was about two million tons. The main increases cover the thermo-plastic products, such as polyvinyl chloride, polystyrene and polyethylene. It is in this latter field that the biggest expansion in plastics production is likely to take place over the next few years. It is just 25 years since polyethylene (polythene) was accidentally discovered by I.C.I. in an attempt, suggested by Sir Robert Robinson, to condense benzaldehyde with ethylene under high pressure. It is now manufactured by polymerizing ethylene in the presence of traces of oxygen and under high pressure and elevated temperature. The polythene thus formed has a low softening point and low specific gravity. It is a plastic of great versatility and finds wide application in the packaging of both foodstuffs and textiles, in household goods and in the production of pipe lines, wire and cables. More recently new processes have been found which obviate the use of high pressure. Outstanding among such is the Ziegler process in which catalytic amounts of transition metal halides such as titanium trichloride, together with aluminium triethyl, are employed to promote the polymerization of ethylene at atmospheric pressure to give high density polyethylenes possessing greater rigidity, and making them of particular value in the moulding and extrusion fields. The total production of polyethylene in the United States reached in 1957 some 350,000 tons, of which about one-third was exported, and in the United Kingdom just on 60,000 tons.

All this represents only one facet of the field of 'chemicals from oil' which has been constantly expanding throughout the world and especially in the United States over the past thirty years. In the latter country the production of petrochemicals in 1957 reached the astonishing total of some 17 m. tons or 26 per cent of all United States organic chemicals made, while it is estimated that by 1965 the output will be more than doubled.

Although in Europe generally organic chemicals have been and will continue to be manufactured by coal carbonization, the world output of many coal-tar products, particularly aromatic hydrocarbons such as benzene, toluene and the xylenes, will soon fall far short of demand, and this will have to be made good by chemicals derived from petroleum. Already in this country the yearly output of petro-chemicals is over 250,000 tons, or about one-third of our total production of organic chemicals.

I have already mentioned nylon, the first wholly man-made fibre to be produced and a material which proved of incalculable value to the Allies during the war years on account of its high tensile strength. At that time one of its main uses was for parachute production, but now it is better known in its peacetime application as yarn knitted into stockings and clothes and for the tyre-cord market, where it is beginning to be a serious rival of rayon. The term 'nylon' to-day is actually a generic one and many other members of the same family are familiar to the public. Among such I would mention the British material, terylene, a polymer of ethylene glycol and terephthalic acid, both of which are now derived from petroleum. Terylene is much used as a blending agent together with cotton and wool in the clothing trade. Other synthetic fibres are orlon and acrilan, whilst the newest arrival emanates from Courtaulds under the name courtelle, all being derived from acrylonitrile.

So far I have directed attention particularly to the production of what are really organic manufacturing or constructional materials and which rival, or in many cases excel, the traditional ones. The very name 'fine chemical industry', however, suggests specialist products, and nowhere has advance in the industry been more conspicuous than in the fields of medicine and agriculture during the present century. Up till 1908, the main object of medicine was in curing or alleviating pain and disease, and this was assisted by many useful plant products, such as opium, quinine, the ergot alkaloids, digitalis and squill, employed either in a chemically pure state or in the form of galenical extracts.

The first radical departure from this age-old tradition was due to Ehrlich, who sought to prepare synthetic organic compounds which would specifically attack invading parasitic organisms without injury to the host. After lengthy and carefully planned work with certain dyestuffs, success was achieved by the introduction in 1909 of salvarsan, an organic compound containing arsenic for the cure of syphilis, a disease caused by a particular spirochete. Despite intensive research throughout the world, this finding, which marked the beginning of chemotherapy, stood more or less as an isolated example for more than two decades until the discovery of the efficacy of an azo dye known as prontosil, noted by Domagk in Germany in 1934, opened the way to the successful clinical treatment of a wide range of streptococcal and staphylococcal diseases by means of the so-called sulpha drugs. Domagk's work was followed up in 1935 when Trefouëls and Fourneau of the Pasteur Institute proved that the effective moiety of the prontosil molecule was sulphanilamide. Development rapidly followed, and to-day we have a wide range of specific sulpha-drugs capable of overcoming very varied pneumococcal and other bacterial infections. In this way

a new and powerful weapon was forged in man's continuous struggle against disease.

The impending outbreak of the Second World War resulted in attention being focused upon the possibility of finding other chemotherapeutic substances which would be more powerful and at the same time less toxic than the sulpha-drugs. Penicillin, the bacteriostatic constituent produced from a certain strain of the mould *Penicillium notatum*, was discovered by Fleming in 1928, but it was not until 1939 that Florey and Chain began research aimed at isolating the antibiotic agent in a state sufficiently pure for clinical use. As is now known, penicillin possesses a hitherto unparallelled degree of biological activity against a wide range of Gram-positive organisms, having at the same time almost negligible toxicity. Because of these quite phenomenal properties, intensive Anglo-American investigations were put in hand during the war, resulting in a commercial process for its manufacture being reached and ultimately in the isolation of penicillin-G in crystalline form. Subsequently a large range of other antibiotics were discovered, several of which are of outstanding therapeutic value. Among these mention may be made of streptomycin, now so widely used for the treatment of tuberculosis, while other versatile antibiotics are chloromycetin, aureomycin, neomycin and terramycin, all of which offer a high degree of control against many organisms resistant to penicillin. Within two decades the production of antibiotics has attained a scale which would have seemed quite impossible to the microbiologist as recently as the outbreak of the Second World War. Foremost in this field is undoubtedly the United States, but British exports are quite high, amounting to nearly £9 million in 1957, out of a total export of drugs and medicines which reached the value of £40 million.

Apart from antibiotics, spectacular progress has been made since 1940 in other pharmaceutical fields. The severe curtailment of supplies of quinine to both the United States and the United Kingdom following the conquest of the Dutch East Indies by Japan, necessitated its rapid replacement by a synthetic substitute. Researches in this connection reached a culmination in the discovery of paludrine in Great Britain and of chloroquine in America, the latter having a structural similarity to an earlier German drug, plasmoquine, but being much less toxic. Progress in synthetic medicinals does not stop here but covers a wide range of drugs for use in many diseases, such as arthritis and hypotension, and extending even to means of alleviating mental disorders.

Reverting to malaria, this and many other tropical diseases, such as trypanosomiasis and yellow fever, are insect-borne and hence, in place of drug curative measures, it would obviously be more important to eliminate the cause by a direct attack upon the insect vector. The advent during the last war of the newer and almost incredibly potent insecticides, such as D.D.T. and B.H.C. to make good the loss of pyrethrum and derris, has had an unparallelled effect on the suppression of such diseases. Formidable as these new weapons have proved to be in the war against human diseases, they are no less valuable in the constant

battle waged to offset the ravages of insect pests upon both growing and stored crops and timbered lands.

As always, once a new field has been opened, ever more powerful and specific chemicals are evolved, often serving purposes far removed from those envisaged at the outset. Thus, hand in hand with an increasing number of insecticides for specific purposes, other organic chemicals are now being used on a large scale as selective herbicides which enhance the growth of grasses by the derangement and eventual suppression of competing weed growth. These discoveries have already had a pronounced influence on the global production of food-stuffs. Research in other directions aimed at increasing the world supply of food is showing definite promise. Thus it has been found that antibiotics exert under certain conditions a profound effect upon the rates of growth of poultry and pigs. This new knowledge is now being widely used with conspicuous success.

I have never been a prophet of gloom regarding the failure of Nature's supplies and the imminence of world famine and, thanks to the chemist, we have survived the days when world starvation was thought by some to be inevitable through the depletion of our natural nitrate supplies, a danger averted by the brilliant researches of Haber and La Rossignol on the fixation of atmospheric nitrogen. Recently the Director of the Commonwealth Bureau of Dairy Science and Technology, Mr. A. W. Marsden, expressed the view that whereas the present population is estimated at 2,500 million, he believed the world could feed 5,000 million people. He rejected pessimistic views on the subject but considered that a greater application of science to agriculture would be needed.

In this lecture I have attempted to emphasize the truly remarkable aptitude and fertility of mind which the chemist has manifested in satisfying all demands made upon him, especially those arising in a world continually striving for a higher standard of living. It must be admitted, however, that the knowledge and skill of the chemist have been, and still are, predominantly concerned with the utilization of the stored up wealth of Nature, made available to us in the form of fossil fuels. Inevitably, sooner or later these supplies will be used up, but it is now certain that already the scientist is placing at man's disposal other sources of energy which will open up an entirely new vista of wealth and opportunity. I refer here to the peacetime application of nuclear energy which we are already witnessing in being at Calder Hall. However, technological advances to-day follow one another with such rapidity that what was an outstanding event but a few years earlier sinks into insignificance when compared with the possibilities which can be envisaged by the production of thermo-nuclear power through Zeta. *The Financial Times* of Saturday, 25th January, in an Editorial commenting on this, says 'It is to be hoped that this discovery will not go the way of many, where Britain has been first in research but well behind in industrial application'. To me as a chemist these are timely words, particularly in view of the way we have failed in the past to win through to the high rewards which British discoveries made possible. Although during the past decade our organic chemical industry has made enormous strides and its exports in 1957 reached nearly £300 million, it must not be overlooked that for a considerable part of this time competition

in Europe was comparatively negligible. The picture is now changing and the growth of the chemical industry in Germany and Japan is expanding at a rate superior to ours. We also have the great unknown factor of Russia, with its enormous reservoir of trained scientists and technologists. Since I originally wrote this address we have read of Russia's intention to spend nearly £1,000 million on expansion of the chemical industry. If the European Common Market and the proposed Free Trade Area become effective, we shall have to meet a challenge which will certainly strain us to our utmost. That the Government have still not faced up to the position is evident from a perusal of the Annual Report of the Department of Scientific and Industrial Research for 1956–57, which discloses grave misgivings on the part of the Council regarding the funds placed at its disposal. The total sum available is under £10 million, while industrial production apart from defence amounts to £10,000 million a year. We need now, more than ever before, enlightened and bold leadership, both on the part of Government and Industry, if our nation is not to become a third-rate power. Sir William Pope's remarks quoted earlier seem ever more commanding and prophetic than when they were first uttered in 1919:

> The coming struggle for scientific and industrial position, on the results of which must rest the whole intellectual, artistic and material future of our race, will call for longer, greater, more persistent and more intelligent effort than any which we have hitherto exerted.

To-day, after nearly 40 years, when all the major issues facing mankind depend upon scientific and technical knowledge for their solution, these words indeed ring out with renewed meaning.

THE CHAIRMAN: I am sure that all members of the audience would like me to thank Sir Ian for his masterly survey of the structure of industrial chemistry in the twentieth century. I think we can all agree that this has been a very fit and proper memorial to Sir William Pope.

The vote of thanks to the Lecturer was carried with acclamation and, another having been accorded to the Chairman upon the proposal of the Earl of Halsbury, the meeting then ended.

GHANA

A paper by

HIS EXCELLENCY EDWARD O. ASAFU-ADJAYE,

High Commissioner for Ghana in the United Kingdom, read to the Commonwealth Section of the Society on Thursday, 8th May, 1958, with Sir Selwyn Selwyn-Clarke, K.B.E., C.M.G., M.C., M.D., F.R.C.P., Chairman, Commonwealth Section Committee, in the Chair

THE CHAIRMAN: I had the pleasure of knowing Mr. Asafu-Adjaye over twenty years ago, when I was Head of the Health Department in what is now Ghana. Ghana, the Gold Coast, was my first love. It was the first colony to which I was appointed in the Colonial Service, and unlike many romantic attachments it *did* remain my first and last love although I have had most interesting times in many other parts of the world.

His Excellency went to school first in Kumasi in Ashanti and then in Cape Coast before coming to this country to graduate at University College, University of London, in philosophy in 1925. In 1925 he entered the Inner Temple as a student and won the Profumo prize of 100 guineas. In 1927 he was called to the Bar. After practising in the Supreme Court in Accra for seven years, he transferred to Kumasi when the Courts opened there. While in Ashanti, Mr. Asafu-Adjaye was a member of the Kumasi Public Health Board and also of the Asanteman Council (which is, as you probably know, a Council which advises Sir Osei Agyeman Prempeh the Second, the King of Ashanti or the Asantehene). In 1946 he was nominated to the Legislative Council of the Gold Coast and in 1951 to the Legislative Assembly, with the portfolio of Local Government. After being elected to the Legislative Assembly in the 1954 election he continued as Minister of Local Government until the following year, when he became Minister of Trade and Labour. He decided not to seek re-election in 1956, and returned to take up his law practice. In accepting his present post as Ghana's High Commissioner in the United Kingdom and Ambassador for Ghana in France at his country's behest, he sacrificed a very lucrative law practice. He brings to his task a brilliant intellect, a wide experience and knowledge of the needs of his country.

THE LECTURER: Before reading the paper which I have prepared I should like to express my thanks to the Society for giving me this opportunity of saying a few words to them. It is a great pleasure to be here this afternoon, particularly since it enables me to meet so many old friends, amongst them Lady Moore-Guggisberg, who knew me when I was quite young. I am particularly gratified to see that they have not lost touch with us in Ghana and still continue to show interest in our young country.

The following paper was then read:

THE PAPER

As you will also see a film, my talk will be fairly short so that there may be time for questions.

Until 6th March last year Ghana was known as the Gold Coast, a name which recalled the handsome returns which merchant adventurers derived from the country. There is evidence that the Gold Coast was known to the Phoenicians; certainly the country was known to European navigators in the fourteenth century. It was not, however, until 1471 that the Portuguese began the first permanent European settlement on the coast. The Portuguese were followed to the country by the Danes, the Dutch, the Swiss, the French and the Brandenburgers. The main interest of these foreigners was trade.

In the initial stages the method was very simple. Fanciful objects would be left on the coast by the European merchant adventurers, who would then retire to their boats. Quantities of gold dust would then be placed beside these fancy goods by interested Africans, who would then retire. The European merchants would then return and remove the gold dust if they found the amount acceptable as fair exchange for their goods. When the merchant adventurers had left, the African traders would go back to the scene and remove the goods left as exchange for their gold. Soon this interesting trade was superseded by the slave trade, and the country entered what was perhaps the darkest period of her history, when millions of her sons and daughters were ferried across the seas under great humiliation and suffering to distant lands. The abolition of the slave trade and the return to legitimate trade saw rapid progress in the country. To-day Ghana exports no less than £74 million worth of goods, consisting mainly of cocoa, gold, timber, diamonds and bauxite. These exports enable us to earn sufficient foreign currency to buy some of the daily necessities of a reasonably decent life and also to provide the capital goods needed for our development plans.

To carry out to a successful conclusion such an ambitious programme, a stable and progressive government is an absolute necessity. In the colonial days, generally, the Colonial Office-appointed Governor ruled with or without the advice of Legislative and Executive Councils composed mainly of British administrative officials. To-day the Government is similar to that of Britain, except that we have no Upper House in the Ghana Parliament. Dr. Nkrumah's Convention Peoples' Party controls 72 out of the 104 seats in Parliament, and there is no danger of a fall of government every month! If anything, some people are rather concerned about the tremendous power of the Government and the way it has been exercised. Some of these criticisms are from people who have a chronic and rather uncivilized belief that anything from Black Africa is Black! However, we recognize that some of the criticisms are from genuine and sincere friends. To them, I can do no better than quote what the Prime Minister had to say on the matter recently. 'At home we have done much during the year to consolidate our Independence. Some of our actions have as you know, been severely criticized by a section of the Foreign Press. I am convinced, however, that some of these criticisms have been founded on an inadequate background of recent affairs in Ghana, and my general assessment is that our actions have been effective and useful.'

And what does consolidation of Independence mean? It means the realization

of, and the determination to provide for, our shortcomings and needs, without which our independence would be only in name and not a reality. For example, democracy and a full life are extremely difficult in a country with much illiteracy. Thus, to maintain our independent and democratic Government, priority must be given to education. Realizing this, the Ghana Government is spending over £7 million on education in the current financial year.

The foundation for a sound educational system has been laid by missionaries and the colonial Government, and a great impetus was given to educational expansion by the national Government in 1951. Higher education is not being neglected: Kumasi, the capital of Ashanti, can boast of a fine College of Arts and Technology, while Accra, the capital, has a fine University College where, by the co-operation of the University of London, internal degrees of that University are awarded.

Sound minds must be in sound bodies, and so the eradication of disease and the improvement of the health of the people are receiving great attention. We have travelled a long way, Mr. Chairman, since those memorable days when you did such pioneering and outstanding work in the then Gold Coast and endeared yourself to her people. To-day, malaria is under reasonable control in the large towns, and the larger hospitals have the services of a fair number of African as well as foreign specialists. In the villages, dispensaries and health centres form important links in the plan for the control and cure of diseases.

In our determination to build a modern state, we are not forgetting our past. After all, we chose the ancient name of Ghana for our free country to remind us of our links with the past. When the Ghana Empire which flourished in the Western Sudan over a thousand years ago fell to the warriors of Islam, some of the Ghanaians fled southwards and are believed to have settled in what was until recently known as the Gold Coast. And so, when we became independent, we adopted the ancient name of Ghana as a link with the past and an inspiration for the future. The name Ghana is therefore the formal expression of our belief that we must take the good of the past and blend it with what we believe to be good and true in the culture of the civilization we are now embracing. Thus, active steps have been taken to encourage the survival of our fine traditions; these are as varied as the many languages of the four and a half million people of Ghana. Each tribe has its own forms and customs, but there is one institution which is common to all—Chieftaincy, and the ceremonial associated with it. This institution is fundamental to the traditional way of our popular Government, and it is the declared intention of both the Government and the Opposition to maintain the institution of Chieftaincy in a progressive form. Other expressions of our traditions and culture like drumming and dancing, carving and weaving, are actively encouraged. In this way we hope that, in our forward march, old and new may be merged together to produce a deep and satisfying harmony which may not only be the expression of the African personality, but also of the African contribution to modern civilization.

The paper was followed by a showing of the film Ghana.

DISCUSSION

THE CHAIRMAN: His Excellency's mention of the shameful slave trade reminds me that at Christiansborg Castle at Accra, which is now the residence of the Prime Minister, Dr. Nkrumah, there are still dungeons (used now, no doubt, for entirely innocent purposes!) in which slaves were kept before they were sent overseas. At my first visit to the castle the Governor was Sir Gordon Guggisberg, whose widow has graced our meeting this afternoon. Sir Gordon left behind him two monuments, the Prince of Wales College of Achimota, which was the forerunner of the University College of the Gold Coast, and Takoradi Harbour. The last Governor (Governor-General) to occupy Christiansborg Castle was Sir Charles Arden-Clarke, to whose lasting credit lies the preparation of the former Colony of the Gold Coast for self-government and independence.

Our lecturer's reference to the government in colonial days was necessarily brief in order to maintain a balance in his address, and I hope His Excellency will not mind me mentioning that in both the years in the middle thirties when I was a member of the Legislative and Executive Councils, there were chiefs and African members elected by the municipalities who took an active part in the debates in Legislative Council and, consequently, in the government of the Colony. I mention the chiefs particularly because I was so glad to hear His Excellency say, 'It is the declared intention of both the Government and the Opposition to maintain the institution of Chieftaincy in a progressive form.' Now this, I suggest, vindicates the opinion held by previous colonial governments in what was then the Gold Coast that not only was it desirable that the people should retain their traditional belief in a good governing chief, but that the chiefs themselves had a valuable contribution to make to the peaceful and wise government of the country. We have here this evening the son of one of the chiefs, Sir Tsi-bu-Darku, the Ninth, of Cape Coast, with whom I was privileged to sit on the Legislative Council. His son, Nicholas de Heer, whom I see in the audience, is now just completing his medical training and I hope by tomorrow will be a fully-fledged doctor. I can truthfully say that I myself received great help and encouragement in my work from such persons as the Asantehene, the Ga Mantse and Mantsemei, the Omanhene of Kibbi, Krobo and many others in what was then the Colony proper, Kumasi and the Northern Territories and British Togoland.

It was very gratifying to hear our lecturer's tribute to the earlier work of missionaries and colonial governments in the educational field. I was recently reading an article by our young friend Nicholas de Heer in which he pointed out the spectacular progress that had been made in education at all ages in recent years. School children, he said, numbered 600,000 in December, 1956, as compared with 235,000 in 1951. Girls are already in the proportion of one to every three boys, an immense stride forward for which all those responsible deserve the highest praise. I do not think it is really fully appreciated, by those who have not been in Ghana, what a real hunger there is on the part of the people for education. I can remember, as a medical officer of health in 1919, having to visit schools and having to tell one or two of the children that they must stay at home until their chickenpox or measles (or some other infectious disease) was better. They would reply, 'Doctor, I beg you, I beg you.' You see, they did not want to miss school. I would see the same children whom I told to stay at home, not going into the school, but putting their ears through the railings to catch just one word from the teacher in the course of a morning's school. That gives you some idea of the real delight that these children take in school, and it is the ambition I believe, Sir, of your Government, that every child up to the age of twelve should enjoy free education.

As we saw from the film, Dr. Nkrumah's Government has also made splendid progress in relation to mass education. Men and women, farmers and labourers,

sitting down perhaps in classrooms designed by our good friends Mr. Maxwell Fry and his wife, Miss Jane Drew (who are with us this afternoon), or sitting down sometimes under the trees and in the light of the setting sun, learning to read and write or to take part in tasks for the benefit of the community as a whole. His Excellency mentioned the developments that have taken place in the control of preventible disease, like malaria, and in bringing help to the sick and suffering. If he—and you, ladies and gentlemen—will allow me to use a colloquial phrase, I should like to say that that statement warms the cockles of my heart!

I know that you would wish me to assure Mr. Asafu-Adjaye, and through him his Government, that we in the United Kingdom are full of admiration for the efforts that are being made in Ghana to raise the standard of living of the people and to increase the quantum of happiness in a free, independent and democracy-loving state.

MR. P. K. SHAHANI: I was once asked by an American Professor, 'Why did your country [Pakistan] join the Commonwealth?' We had two hours of discussion, and then it occurred to me that, after all, the answer was quite simple. I said to him, 'You see it is analogous with the reason that leads people to get married'. I should like to ask His Excellency if he thinks that analogy applies to Ghana. Would he also tell us what is the origin of the word Ghana?

THE LECTURER: The reasons why Ghana joined the Commonwealth are rather complicated, but one of the most fundamental is that which you have mentioned as relating to marriage. We have been associated with Great Britain for a long time, we have imbibed some of her good principles and we feel grateful to this country for the help that it has given us. Secondly, we are connected with the Commonwealth because we believe in the principles underlying it. We hope that by our association with and our participation in the Commonwealth we may be able also to make an African contribution to this great body.

Historians record that Ghana was the name of an ancient kingdom that flourished in past ages, and that due to certain circumstances some of the descendants of that empire found themselves in the present area known as the Gold Coast. The name is a source of inspiration, and Ghana, having obtained its independence, has thought it fit to pay this tribute to its ancient forebears.

MRS. UNA DUVAL: May I ask what is the language of Ghana? Is it peculiar to Ghana or is it similar to that spoken in the other countries in West Africa?

THE LECTURER: Ghana has a variety of languages, each used by a different tribe in an area; but the majority of people speak languages deriving from three basic stocks. The Twi or Akari, the Ewe and the Ga-Adangbe. These three together constitute the main stocks from which descend several dialects and forms of language. We have not been able to evolve one popular indigenous language. The Government has therefore adopted English as its official language. I think that is due to the high regard we have for Great Britain and to the fact also that the English language is necessary in the process of education. We hope in time, however, that we may be able to establish one of our own languages as the official one.

MISS TAMARA STOKES (B.B.C. French Service): Could the lecturer tell us anything about Ghana's relations with neighbouring French territories?

THE LECTURER: Ghana is bounded on the East, West and North by French territories. On the East we have Togoland, on the West the Ivory Coast, and on the North the French territories beyond our Northern Territories. Our relationship with them is quite cordial. In fact, along the frontiers of the two territories we find members of families who are separated from each other merely by an artificial barrier.

It is our intention to foster such friendship with the neighbouring countries as will make it possible in the future for such families to be reunited by the removal of these barriers.

MR. DESMOND BUCKLE: I speak as a Ghanaian, or rather as an expatriate of Ghana, since I have been in this country for so long. His Excellency mentioned that there have been certain criticisms of Ghana, and I would say that all criticism does not necessarily come from people who are hostile, some of it comes from friends—that is my experience as a journalist. I am sometimes worried about certain happenings in Ghana. I am referring, of course, to some of our administrative practices of recent date—the deportations of various people. I believe in the words used by the great Frenchman, St. Just, who said: 'It is by the wisdom of our laws and the virtue of our citizens that we shall become an example to other nations.' Now our Prime Minister has said that we in Ghana stand as an example to the African nations. And while I am absolutely convinced about the virtue of our people, I must say I am not so convinced as to the wisdom of our laws, and I want to put to His Excellency this question of deportation. Can we say that we are very happy about the deportations of people from Ghana without any legal process whatsoever?

THE LECTURER: I can quite understand the feelings of Mr. Buckle but, you know, when a new state comes into existence there are some people who rightly or wrongly endeavour to sabotage its efforts. It may be that deportation orders have been made which, to persons without the evidence that the Government has, might appear to show the existence of an autocratic form of government in the country. No government of any kind takes delight in deportations. Deportation orders are made when deemed necessary in order to bring about a certain situation in the country which will enable law and order to function and to bring peace and happiness to the people. I can assure you that these deportation orders were not made out of spite. The evidence upon which the Government acts is not, for reasons of security, put before the public, but I can assure you that the Government acted in the interests of good order in the country. If you return to Ghana now you will see that there must have been good reasons for these deportations. Naturally, when anybody in this country hears of a deportation, his sympathy goes out to the person who has been deported; but please believe me that the Government of Ghana will not make one more order of deportation unless there is real justification for it. I cannot go beyond that.

THE CHAIRMAN: We are most grateful to His Excellency for joining in that somewhat political discussion. I think you will agree with me that we can quite understand now why he was appointed as the High Commissioner for Ghana and the Ambassador for Ghana in France! I should like to remind Mr. Buckle that when his distinguished uncle (whom I knew very well) was a boy the British Government of the Gold Coast found it necessary to deport Nana Prempeh, who was the predecessor of the present King of Ashanti; first of all to Freetown in Sierra Leone and after that to the Seychelles, from which he was repatriated in 1923-4. I think we should be generous to this new Government of Ghana, and appreciate the fact that it has taken us in England over seven hundred years from Magna Carta days to reach our present stage of development, and there are some of us who are still not entirely uncritical of government, whether it be Conservative or Labour! So I should like to enter a plea that whatever we may feel in our hearts about the freedom of the press, or these deportations to which Mr. Buckle has just referred, we should rather concentrate on the positive achievements—and they are real and great—of this young country. I do not think that we should be too censorious, and I should like to say again that the fact that Dr. Nkrumah has chosen such a diplomatic envoy to represent his Government in this country is certainly a good sign that he is picking on the best type of man in Ghana to explain the actions of his Government in the various countries

of the world. I will now ask you to join with me in according a very warm vote of thanks to His Excellency for coming here to-day, addressing us and showing us his very colourful and lively film.

The vote of thanks to the Lecturer was carried with acclamation.

THE LECTURER: I have the Chairman's permission to thank you for the attention which you have given to my short talk and for spending your time in seeing this film of Ghana. I can assure you that Ghana has it in mind to uphold all the principles of democracy. If anyone has any qualms, please let him make inquiries of our office, and we shall do our best to clear up any doubts or misgivings.

The meeting then ended.

GENERAL NOTES

THE EDINBURGH FESTIVAL

The early days of the Edinburgh Festival, blessed with fine weather, saw that incomparable skyline of fretted pinnacle and crag for once unblurred by mist, and the crowds enjoying a capital very much *en fête*—enjoying the coloured lanterns, like distended onions, suspended along the length of Princes Street, remarking the troughs of flowers all down its middle, and gathering punctually every morning to admire the massed pipes and drums of what seems always to resemble some dazzling flower-bed on the march. More sombrely, the London critics had taken up their strategic positions in the main hotels, while away in Charlotte Square, at the Roxburghe, Mr. T. S. Eliot, that suave and benevolent eagle, was to be observed dispensing coffee as he awaited the first night of his elaborately contrived, ironic melodrama, *The Elder Statesman*, at the Lyceum. The stage was set for the twelfth International Festival, whereat the sun and good will seemed united in determination to refill the depleted coffers.

For the first time since the Festival was inaugurated, it really seemed as if the Fine Arts were no longer content to play Cinderella on an occasion which traditionally celebrates, in the first place, music and drama. That was the more surprising because the main artistic offerings had, in fact, been little publicized in advance, and it was also known this year that Mr. Douglas Cooper was not going to organize another one man exhibition in the great line of Impressionist and Post-Impressionist masters, which have always gone from the Scottish Academy in due season to the Tate Gallery. But we had never suspected that, secretly and steadfastly, Professor and Mrs. David Talbot Rice had been tracking down their treasures of Byzantine art, drawing on collections as distant as Leningrad and Moscow and the museums of Yugoslavia in order to present at this Edinburgh Festival the first exhibition of Byzantine art organized on British soil, and only the third ever to have been staged in Europe. Nor, if the truth must be known—though *The Scotsman* had given us an inkling months ago of the extent of the Moltzau Collection—had we, in London, known just how acute a judge of modern French painting Mr. Ragnar Moltzau was, nor guessed that he had accumulated in Norway quite so valuable a collection from Renoir onwards as now fills three galleries of the Scottish Academy, filling them also with absorbed spectators.

With curious felicity, the Byzantine exhibition at the Scottish Museum has been compared with the earlier, still remembered Festival homage to Diaghilev, in so far as that offered a synoptic view of one of the main threads of modern art, rather as, on a far wider scale, the Byzantine exhibition gives us a picture of the main stream of medieval art. From the sixth century, Constantinople became the foremost centre of thought and art in the civilized world, and its position in subsequent centuries has been aptly described as that of the Paris of the Middle Ages. One cannot hope

to give more than a suggestion of the solemnity and magnificence of the ivory reliefs and icons, often associated with Constantinople, in which the collection is peculiarly rich, not to mention those 'minor arts' which could be transported, as obviously the mosaic and frescoed decorations of the church interiors could not be, though represented here in certain facsimiles. An individual fancy might alight on the fifth-century ivory diptych of a lion hunt from the Hermitage in Leningrad, or again, on the series of icons as memorable as that fourteenth-century 'Virgin and Child' from Moscow, the Madonna's darkling gravity relieved by exquisite passages in the modelling of the face, recalling the Flemish school in the fifteenth century. A beautiful pendant to this exhibition, it should be noted, is the collection of Turkish fabrics, dishes, and other rich crafts of the Ottoman Empire, arranged by Mr. Derek Patmore in the Huntly House Museum in Canongate. There is no assurance that the latter will eventually come south, but it is really of more importance that Londoners should have an opportunity of studying the Byzantine exhibition, as indeed they are promised in due course at the Victoria and Albert Museum.

The Moltzau Collection, set in the midst of the Scottish Academy's own exhibition, has, for its opening item, Renoir's shimmering portrait of Madame Victor Choquet, closing with the contemporary school of post-war French painters of abstract or near-abstract persuasion. In the first room are works as important as Cézanne's *The Bibémus Quarry*, and his sculpturesque *Bathers Before a Tent*, whose curvilinear contours are echoed in Matisse's *The Coiffure* of 1907, and a particularly tender Bonnard, *The Terrasse Family*, which establishes in consonant, pearly colour, and significant placing, a whole series of *ententes* between pairs throughout the household, not omitting a complacent cat with its kitten. In the next room the leading Expressionists include Munch and Soutine with his moving portrait of *The Old Actress*, raddled, almost spent, but still pathetically spry; and so one is led into the main gallery of abstractions which might, with advantage, have been more thinly hung. Nevertheless, this is the first opportunity Edinburgh has had to study so extensive a parade of painters like Bazaine, Manessier, Poliakoff, and the late Nicolas de Staël, whose paintings, as Mr. David Baxandall points out in his preface, are more disciplined, more controlled by a sense of visual order, than the work of the Tachistes or 'action' painters.

An unfortunate result of the generous hospitality of the northern Academy is that its own members' offerings tend to go unnoticed by London critics. It would be a pity, indeed, if sculptures as serious and satisfying as the portrait busts of Mr. Eric Schilsky, or Mr. Pilkington Jackson's imposing head which so persuasively reproduces the rugged character of Robert the Bruce, were to be overlooked by visitors attracted, it might be, to the more capriciously inventive works of those Continental contemporaries who accompany them, somewhat incongruously, in the Sculpture Hall. And while everyone will welcome the further hospitality in accommodating a score of glowing canvases by Sir Matthew Smith, it would be churlish to make no acknowledgment to the President, Sir William Hutchison, and foolish to leave without remarking native paintings as admirable as those by Anne Redpath or W. G. Gillies in other rooms.

Space does not permit a review of what are termed the Fringe exhibitions, which are generally more rewarding this year than in the past. The northern National Gallery's tribute to Sir David Wilkie, however, is certainly no Fringe exhibition. Very honourably does that 'raw, tall, pale, queer Scotsman' take his ambitious place in the history of Georgian painting, compassing at times the *panache* of Lawrence and, in his later manner, essaying a romantic energy which lacks only the impassioned inspiration of Delacroix in the line of Rubens. And if a nineteenth-century painter ever made more vivacious sketches for his subject-pictures than David Wilkie, one would like to know his name.

NEVILE WALLIS

THE ROYAL PHOTOGRAPHIC SOCIETY'S AUTUMN PICTORIAL EXHIBITION

In each of the past five of these exhibitions it has been possible to welcome certain advances and originality in this most important of all annual displays of photographic art. Superb as the 1958 exhibition is, technically, there is little which can be said to further the Society's declared aim: 'to advance . . .'.

The section most popular with visitors—the Stereoscopic Section—contains 106 of these fascinating peep-shows, but there are few surprises and the majority are straightforward 'travel' shots. *Kew Gardens*, by The Marquis of Ely, stands out as a work of taste and subtlety. The 2 × 2 in. colour transparencies are more ambitious, with a much wider range of subject. Always attractive in their illuminated display cases, these miniatures must await the projection sessions for final judgement to be passed.

The colour prints would be a small section indeed (only twelve exhibits) but for the innovation of an additional display of unusual processes. The latter are not included in the Catalogue, but are shown to encourage others to attempt similar methods. In the main section, *Morning at Queens Ferry*, by John Bell, is a print of great charm and William Hu's *Fabulous Lion of Burma* makes a gorgeous splash of colour.

The 231 monochrome prints will be the centre of interest for the majority of the professionals and 'serious amateurs', and it is in this section where the recession is most marked. Almost all the exhibits might have been resurrected from R.P.S. Exhibitions of ten, or even twenty, years ago. Leaky junks and self-conscious faces, still life, table-top, obvious patterns, landscapes, old buildings and pets—all the old subjects are here again. There is much to please the eye of the casual visitor in these technical achievements, but the seeker after 'works of originality and genuine creative feeling' (in the words of the Selectors' invitation) will have to exert himself a little to discover it.

John Ashman's *Quiet Grandeur*, a church alcove, has caught the appropriate air of mystery very well. *Capitol Fog*, by Grant M. Haist, shows us that a really fine picture can still be made from a hackneyed subject. The same can be said of H. A. Murch's *Half Dust, Half Deity* (a powerful composition of two enormous columns) and his *Whymper's Way*, an exalting study of the Matterhorn. Of the copious Chinese contributions, *Ring Racing*, by Manly Chin, makes a strong appeal.

Two landscapes demand mention: *Pente Ensoleillée*, by H. C. Hickman, and *Summer Idyll*, by Bertram Sinkinson. Of the many portraits, there is space only to direct the visitor to Gordon Wilson's remarkable character study of *Sir Charles Wheeler*, in the grand manner, and to *Charles Johnson*, by E. P. Wallis-Jones, in lighter vein. Of the other subjects, *Beach of Life*, by S. R. Roy, is well worth the climb to the second floor.

Only nine monochrome lantern slides reached the required standard: all honour to the six exhibitors who are keeping this fine, but dying, art alive.

The exhibition is open to the public at 16 Princes Gate, S.W.7, until 25th October. It will be on view at Derby Art Gallery from 8th to 30th November, and at Harrogate Museum and Art Gallery during January.

F. L. PAIGE

'SOUTH AFRICAN ART IN INDUSTRY EXHIBITION, 1958'

[There was held in Cape Town from 29th August to 6th September a 'South African Art in Industry Exhibition', the first attempt to present a review of the commercial and industrial art and design now being produced in the Union].

Organized by the Society of Industrial Artists of South Africa, this highly successful exhibition was to have been officially opened by the Minister of Economic Affairs, Dr. A. J. R. van Rhijn, who has consistently displayed keen personal interest in the cause of industrial design, but the death of the Prime Minister earlier that week made the Minister's attendance impossible. In his absence, a gathering of some 150 invited

guests, exhibiting designers from different parts of the Union and others concerned with this field was addressed by the Society's retiring President, Mr. Edward J. Saunderson, who drew attention to the tremendous advance in the quality of both graphic design and product styling in the Union clearly shown by the exhibits. He criticized the 'snob practice' of clients who still insisted on 'buying overseas art' when there was no longer any justification for this. The entries of 65 designers, of whom 38 are members of the S.I.A. of South Africa, certainly bore out the truth of Mr. Saunderson's observations.

It was hoped that a much larger proportion of entries would be received from designers concerned with product styling, as distinct from graphic design, packaging, book design etc., but—as the organizers put it in their introduction to the Exhibition Catalogue—'The industrial designer, in the full sense of the word, is as yet rare or unrecognized in South Africa'. Even so, there were a number of remarkable entries of contemporary furniture, of advanced kitchen, laboratory and hospital utensils in stainless steel, of printed textiles, of ceramics, silver chalices and other altar furnishings, from a total of 13 designers now working in South Africa.

The *venue* of the Exhibition was the Association of Arts Gallery in Burg Street, immediately adjoining the beautiful Old Town House which to-day houses the Michaelis Collection of Old Masters. It is interesting to note that when 14 years ago a first exhibition of advertising art was held in the very same gallery, there were no entries from industrial designers. To-day there are good grounds for hoping that before long an agency comparable in its terms of reference to the Council of Industrial Design in the United Kingdom will be brought into existence in South Africa. The Minister is known to favour such a step and to have made initial moves, but it will probably take his Department—and the Treasury—some time yet before anything concrete emerges.

A hopeful view of the immediate prospects in this direction was taken by Mr. Charles te Water, a former High Commissioner for South Africa in London, who attended the opening of the Exhibition and discussed with Mr. Saunderson and other members of the S.I.A. Council his (Mr. te Water's) earlier efforts to persuade South African industrialists to co-operate in the field of design.

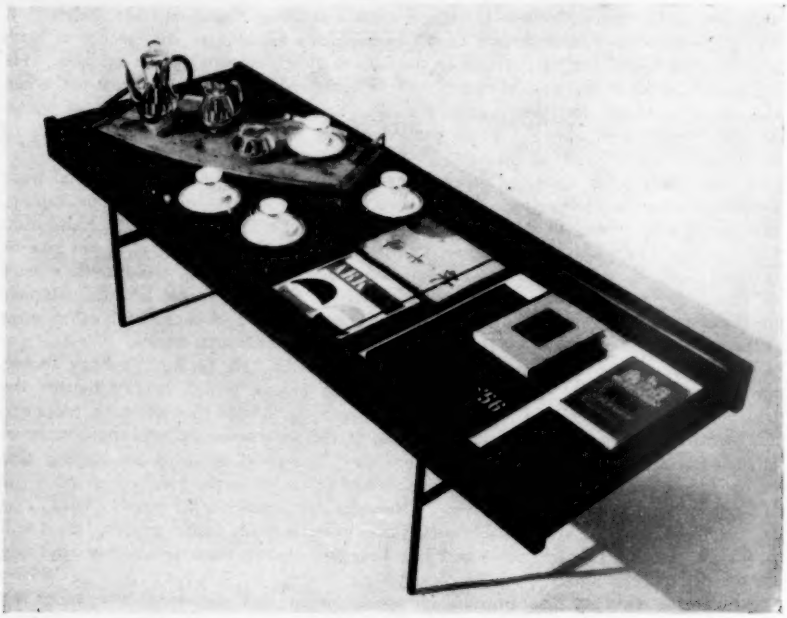
It is always difficult on these occasions to select one or two designers as deserving special mention, but perhaps the outstanding work shown by the young South African designer William Jordaan—recently returned to the Union from a fairly lengthy stay in Britain—is significant as indicating growing acceptance in the Union of the technique of entrusting the presentation of company reports and balance sheets to the *designer*—a facet of public relations work of more than ordinary importance in a country where social conditions are so complex as they are in the Union.

Another feature of the exhibition was the display not only of finished and reproduced work, but—in a number of instances—also of those initial and intermediate stages and phases of design creation and production of which the public is, as a rule, totally unaware. The delicate work shown by the engraver Leo Wyatt, M.S.I.A.(SA.), provided several such glimpses, as did the exhibits of a number of illustrators and display material designers.

RICHARD F. ROBINOW

'A ROOM OF OUR OWN'

An exhibition of furniture and furnishings, in their surroundings, will be shown at the Tea Centre in Lower Regent Street, S.W.1, from 10th–28th October. Entitled 'A Room of Our Own', the exhibition takes the form of a furnished drawing-room and dining-room which have been designed by a team of senior students of the Royal College of Art under the direction of Sir Hugh Casson, R.D.I., and Lady Casson, of the School of Interior Design, and of Professor R. D. Russell, of the School of Furniture Design.



This selection of exhibits from 'A Room of Our Own' includes a coffee table and china coffee set (sponsored and manufactured by W. T. Copeland & Sons, Ltd.) which are already in production. The coffee tray and silver coffee service were both made at the Royal College of Art. The books and magazines are from the College's private press

The year 1958 marks the tenth anniversary of the reorganization of the Royal College of Art by its present Principal, Mr. Robin Darwin, and its recall to the primary purpose for which it was founded—the training of industrial designers. During these last ten years the ties between the College and industry have increased in strength and number, and one of the most significant features of the forthcoming exhibition is the extent to which both industry and the distributive trade have come forward in its support. Many of the pieces to be shown have been made by manufacturers at their own expense. Most of the furniture, which was designed for production, has already been bought for this purpose by a group of retail stores. The whole enterprise is therefore not only a striking example of academic-industrial co-operation, but demonstrates the confidence which manufacturing firms have come to place in the intrinsic merit and utility of the work produced at the College.

The exhibition will be open daily, except Sundays, from 10.30 a.m. to 6.30 p.m. There is to be a charge of 2*s* for admission.

THE HARKNESS FELLOWSHIPS OF THE COMMONWEALTH FUND

It is announced that the awards which since 1925 have been named 'Commonwealth Fund Fellowships' are now revised under the title, 'The Harkness Fellowships of the Commonwealth Fund'. Thirty Harkness Fellowships are offered in 1959 for

award to British subjects of either sex who are citizens of the United Kingdom and overseas territories.

The Commonwealth Fund is an American philanthropic foundation endowed by the late Mrs. Stephen Harkness, and the late Mr. and Mrs. Edward S. Harkness, with the intention of providing opportunities for education and travel in the United States for 'young men and women of character and ability, potentially leaders in their own country'. Interpreting this ideal of international education in the light of present conditions, the administrators of the Fund have this year made an important change in the policy governing the award of Fellowships. In order to make possible the entry of candidates from a broad range of vocational interests, non-academic as well as academic, it has been decided that the 1959 British Fellowships—which are under the patronage of Her Majesty The Queen—should no longer be restricted to university graduates or those with special experience (e.g., in Government service or journalism). Applications will now also be considered from men and women who hold qualifications conferred by recognized professional bodies, or who have reached 'an attested level of accomplishment' in their chosen fields. It is hoped that the introduction of this latter type of candidacy will encourage outstanding young representatives of British writing, painting, music and literature to apply.

Full details concerning eligibility, selection, tenure and emoluments, together with application forms, may be obtained from the Warden, Harkness House, 38 Upper Brook Street, W.1. The closing date for the receipt of applications is 2nd December, 1958.

TOWN AND COUNTRY PLANNING ASSOCIATION CONFERENCE

The Town and Country Planning Association is holding its 1958 National Conference, entitled 'Positive Planning', at County Hall, London, S.E.1, on 30th and 31st October. The Conference will begin with an appraisal of the basic principles on which positive planning should be based. It will go on to consider the major problems in the country and in the towns and, finally, will examine the kinds of enterprise required to make planning successful, acceptable, and hence more positive, in its aims and achievements. These proceedings will be opened by the Rt. Honble. Herbert Morrison, M.P. The principal speakers include Sir Frederic J. Osborn, Mr. R. L. Stirling (County Planning Officer for Lincolnshire), Mr. E. G. S. Elliott (Chief Technical Planner, Ministry of Housing and Local Government) and Mr. J. F. Q. Switzer (Lecturer in Estate Management at the University of Cambridge). The price of tickets (including a copy of the Conference papers) is 30*s.* each for members of the Association and £2 2*s.* each for non-members. Those interested are advised to make early application to the Director, Town and Country Planning Association, 28 King Street, London, W.C.2, who will supply full details of the programme.

THE LIVERPOOL BLUECOAT SOCIETY OF ARTS

Since its foundation in 1927 the Liverpool Bluecoat Society has sought to encourage the practice and enjoyment of the arts amongst the people of Merseyside. In its headquarters, the fine early eighteenth-century forecourt known as Bluecoat Chambers, may be found the workrooms of numerous painters, sculptors, musicians, architects and societies promoting artistic and literary skills. This year, as a result of a generous grant from the Gulbenkian Foundation, the Bluecoat Society has been enabled to realize a long cherished idea. From 13th to 28th October there will be held in Liverpool a series of concerts, lectures and recitals, and several exhibitions, designed to present a picture of all the arts which flourished together, and were related one to another in that period of English history known as 'The Augustan Age'. This celebration has been planned on a scale commensurate with its subject, and will be supported

by contributions from a distinguished list of scholars and performers. The full programme of events may be obtained at the 'Celebration of the Arts', Rushworth & Dreaper, Birkenhead or Liverpool.

INTERNATIONAL APPRENTICESHIP COMPETITION, 1958

The *venue* of the International Apprenticeship Competition, which has been held in Spain since its inception in 1947, was this year transferred to Brussels, and aroused wide interest. The competition, comprising a series of tests (made known only when they begin) in the metal, wood, electricity, building and silversmithery trades, has considerable educational and industrial value. It is designed to give young apprentices and pupils in vocational training schools a special incentive to reach high standards of craftsmanship, and to enable them to meet, mingle with and show their skill against, apprentices from other countries.

The appeal carried by these unusual opportunities was reflected this August in the increased participation by British firms and in the encouraging performance of the young people selected to represent them. This country entered a team of twenty. Four apprentices won first prizes in their respective trade competitions (bricklaying, jewellery, silversmithery and turning), two won second prizes (in engraving and jewellery) and five won third prizes (for sheet pattern-making, fitting, oxy-acetylene work, and carpentry (two awards)). Of the ten European countries represented, Britain had the third largest team and tied with Italy in securing the third largest number of first prizes.

Arrangements for the selection of this year's British team were made by an organizing committee established for this purpose under the auspices of the City and Guilds of London Institute in 1956. The Committee and the Institute emphasize that success in these competitions is a significant addition to Britain's industrial prestige overseas. The 1959 apprenticeship competition will probably be held in Western Germany.

OBITUARY

DR. RALPH VAUGHAN WILLIAMS, O.M.

We record with regret the death, on 26th August, of Dr. Ralph Vaughan Williams, O.M., who in 1955 was awarded the Albert Medal 'for his eminent services to music'. He was the first musician to receive this distinction.

Dr. W. Greenhouse Allt, Principal of the Trinity College of Music, has written the following memoir.

The world of music, and English music in particular, has lost a composer of genius in the death of Ralph Vaughan Williams, whose ashes were laid in Westminster Abbey on 19th September. His passing at the age of 85 was sudden and, mercifully, swift and painless.

A man of the West country, born in the Cotswolds at Down Ampney where his father was Vicar, he went from Charterhouse to the Royal College of Music before going up to Trinity College, Cambridge, where he took his B.Mus. while still an undergraduate in 1894, and proceeded to his Doctorate in 1901. Vaughan Williams received many honours; the Order of Merit from the King in 1935 and, among others, an Honorary Doctorate from the University of Oxford in 1919 and a life Fellowship of The Worshipful Company of Musicians in 1934.

The music of Vaughan Williams, varied products of an original mind, is of a wide range and includes nine symphonies and other orchestral works, operas, ballets, chamber music, incidental music and film music, music for strings, for military and brass bands, for solo voices and solo instruments, choral music, church music, music for the Salvation Army, for schools and for young people. Grove's *Dictionary*

of Music and Musicians contains an eight-page catalogue of his compositions, and says of him: 'His art, being rooted in tradition, has had the strength to be progressive. It has been singularly consistent in its development, perhaps because he found his artistic creed as soon as he had found his style, so that the instinctive and the rational sides of his mind have always worked in harmony. His music, though so personal in idiom that it can be recognized in the space of a few bars, has arisen out of the life of the community and the spirit of the time to which he belonged.'

Composition did not absorb all his energy for, as a practical musician, he was organist of South Lambeth Church in 1895; and in 1904 a member of the Folk Song Society, where he co-operated with Cecil Sharp in collecting folk music. Folk-song, with its modal scales and pastoral atmosphere, became a major formative influence and an abiding interest in his musical life. Active participation in the Competitive Festival movement as adjudicator, in the Leith Hill Festival (Dorking) as Director from 1905 to 1953, in the Bach Choir, where in 1920 he succeeded Sir Hugh Allen as conductor—these he regarded as a practical contribution to the musical life of his day and generation. In 1904 he edited two volumes of 'Welcome Odes' for the Purcell Society, and later, as editor of the music of *The English Hymnal*, he contributed many beautiful tunes, notably 'Sine Nomine' to the words of 'For all the Saints', and 'Down Ampney' (in memory of his birthplace) to the words of 'Come down, O Love divine'. So deep and continuing was his interest in church and organ music, that only last year he became President of the first International Congress of Organists to be held in London.

For those of us who loved him as a personal friend, and for countless others who knew him only through his music, life has become the poorer by the passing of one who was truly a great and inspired musician and who has rightly been described as 'an entirely genuine and generous man'.

We also record with regret the deaths of three Fellows of the Society.

CAPTAIN A. HAYTON COWAP

Captain Amos Hayton Cowap. who died on 28th August at the age of 80, was a chemical engineer of great experience and achievement. He was first employed by Brunner, Mond and Company as long ago as 1891, and after active service in the First World War became chief engineer of the company's synthetic ammonia factory. This subsequently became the Billingham works of I.C.I. which, largely as a result of Cowap's able guidance, developed into its present great size and importance.

Captain Cowap was elected a Fellow of the Society in 1938.

MR. G. A. DENNY

Mr. George Alfred Denny, who died in Durban, Natal, on 10th September aged 90, played a leading part in the development of the Rand goldfields, where he initiated the sinking of the earliest deep level shaft. He had already acquired wide experience as a mining engineer in Australia, Mexico, and Europe when he came to South Africa in 1893, and thereafter his career followed a steady course of success. He was a Foundation Member of the Australian Institute of Mining Engineers, past-President of the Mexican and the South African Institutes, and Gold Medallist of the London Institute of Civil Engineers.

Mr. Denny was elected a Fellow of the Society in 1934.

MR. E. W. M. HEDDLE

Mr. Eric W. M. Heddle, M.C., M.A., B.Sc., for a number of years the Society's representative on the National Film Library of the British Film Institute, died at Ilford on 10th August, aged 63.

A Scotsman by birth, Heddle was educated at Hamilton Academy and Glasgow University, and served with distinction in two Highland regiments during the First World War. Thereafter, with the exception of several years spent in the employment of the B.C.C., he devoted himself to teaching, his principal subject being physics. But as his contributions to the Society's *Journal* testify, photography and the film were also prominent amongst Heddle's scientific interests. He was an Associate of the Royal Photographic Society, and chief examiner in photography to the City and Guilds of London Institute, in addition to sharing in the management of the British Film Institute.

Mr. Heddle was elected a Fellow of the Society in 1937.

NOTES ON BOOKS

ITALIAN JEWELED ARTS. *By Filippo Rossi. London, Thames and Hudson,* 1957. £8 8*s net*

The subtle frost tints of gold-mounted rock crystal, the lace effects of silver filigree or the pictorial detail in enamel work exquisite as miniature painting must surely present any printer with challenging problems of colour reproduction. Yet in *Italian Jeweled Arts* every detail is clear, every differentiation of texture, every colour tone from austere chalcedony cameo to breath-takingly brilliant jasper and lapis lazuli.

It is difficult in words to convey the sheer beauty to be found in this book. There are eighty-five pages of plates in full colour and gold, as well as eight in gold and silver and forty-two in black and white, and for once it may fairly be claimed that the reproductions give the viewer a really satisfying sense of seeing, almost of handling, the magnificent goldsmiths' work that made Italy the envy and marvel of the western world.

This is essentially a book to look at. The letterpress is brief and the author, superintendent of the museums and galleries of Florence, Pistoia and Arezzo, can attempt only a few background details. Even here one could wish for far more information, including sizes, the identity of many precious stones, and other constructional facts to supplement the account of their designers and craftsmen. Nevertheless, Dr. Rossi offers interesting glimpses, beginning as early as A.D. 1000, when Italian art acquired a specific character, and continuing until the seventeenth century, when its special stylistic merits were lost in a spate of exuberance, virtuosity and colour elegance.

Early examples gloriously demonstrate the pre-eminence of enamel work, and indeed limpid enamels highlight nearly every page of the book. The exquisite technique of applying translucent enamel to modelled silver leaf was a Sienese triumph, achieving, the author claims, some absolutely new effects, blending pictorial and sculptural elements, superbly conveyed by the fourteenth-century reliquary of the Bolsena Corporal.

By the fifteenth century Italy's Renaissance goldsmiths were usually sculptors, treating their precious metal as if it were bronze. This was a century with a great predilection for classical antiquity. Lorenzo the Magnificent himself had a passion for late antique and medieval vases, splendidly exemplified in this volume by a ewer in dusky sardonyx and a flaming jasper vase mounted in gilded silver now in Florence's Museo degli Argenti. This delight in mounting semi-precious stones and cut crystal became even more important in the sixteenth century: the author stresses that the goldsmiths' work was far from subservient to the stone and made a decisive contribution to the result, a fact brought out by illustrations that brilliantly differentiate between the textures of cut stone and wrought metal. Florence and Rome are particularly associated with goldsmiths' work, but the author draws attention to the contributions of other cities, such as the cut crystal vases of Milan, and the delicate

jewellery of Venice, including the enamelled gold and pearls that dominated sixteenth-century ornament and the more reticent filigrees that inspired Venice's first subtleties of needlepoint lace.

Inevitably much of this short monograph is devoted to attributions of designer and craftsman. Surprisingly perhaps, the author appears to hold Benvenuto Cellini in the same high regard that he held himself, and four fascinating pages are devoted to views of the famous salt cellar as, the author claims, the only authentic Cellini work remaining. He praises this as 'an isolated product of an art far beyond the reach of any imitation'. But on such close scrutiny Earth and Neptune remain uneasy, elongated figures in a difficult Mannerist style. It is perhaps a relief to turn back a page to the coffret probably designed as well as superbly made by the renowned Valerio Belli, or to such simple beauty of twelfth-century silver craftsmanship as the altar frontal quite perfectly reproduced in Plate II.

G. BERNARD HUGHES

AN INTRODUCTION TO THE ARTS OF JAPAN. *By Peter C. Swann. Oxford, Bruno Cassirer,* 1958. *45s net*

The recent exhibition of sculpture and painting from Japan held at the Victoria and Albert Museum has probably changed the ideas that many of the twenty-eight thousand visitors had about Japanese art. They will now be aware of a far greater range in the expression of disciplined emotions than could have been deduced from the eye-flattering but over-facile craft work that has mainly been accepted as a token of the Japanese spirit. The extent to which this will promote international goodwill, as hoped by the Japanese sponsors of the exhibition, is difficult to gauge. One certain result will be a desire to see more things like the ones sent over. Unfortunately this will be largely frustrated by the meagre nature of British collections in this field, so any interest arising out of the exhibition will have to find another outlet. Perhaps the demand for examples of Japanese decorative art will be stimulated, or, as forecast in certain sections of the press, the current influence of Japanese taste on European design may be strengthened. Low furniture, movable screens and wall-papers borrowing decorative devices from Japanese painting have already invaded a number of homes in this country. These trends will doubtless continue, accompanied by an increased appreciation of the source from which they come. But quite apart from any response in these terms it is to be expected that many people will simply wish to learn more of the things seen at the exhibition and to be reminded of them by photographs.

One of the critics who saw the exhibition promised his readers hard work with the catalogue if they were to gain even limited understanding. The problem which faces any orientalist in introducing occidental readers to an art with which they have almost no cultural links is how to cut down this hard work without too great a loss of enjoyment and appreciation. The cultural background of Japanese art is so remote from our own that the person who faces it for the first time must be prepared to learn something of Far Eastern history and religious concepts. This sounds frightening but, as Mr. Swann has shown, the process of gaining an insight into this art need not be so difficult as may appear.

In covering the whole range of Japanese art the author has shown particular skill in the selection of material and balance of emphasis. This is not easy when one thinks of the complicated web of artists and styles which have to be dealt with in, say, painting of the Ashikaga period. It is also refreshing to find a complete lack of hypocrisy in his attitude to Japanese as against Western canons of æsthetic criticism. His own approach is clearly opposed to the rather esoteric one favoured by some orientalists. Iconographic complexity or the austerity of early Heian period images obviously do not appeal to his taste, and when he extols the Ukiyo-e school in contrast

to the worn-out ideas of more aristocratic painters he is clearly voicing his own feelings and not merely allowing his judgement to be tempered by what the average reader will find palatable.

The book is easy to handle, with the plates conveniently placed in relation to the text. Some of the illustrations are a trifle small for the scale of the objects they reproduce, but this is to some extent offset by the intelligent use of details. The only obvious waste of space is the list giving names of print designers in Japanese characters. Books on prints already cater for this need. In a general survey such as this a glossary would have been more worth while.

ROBERT SKELTON

BRUSH DRAWING IN THE CHINESE MANNER. *By Fei Cheng-wu. London, The Studio (How To Do It Series, No. 73), 1957. 25s net.*

PEN LETTERING. *By Ann Camp. Leicester, The Dryad Press, 1958. 8s 6d net*

'Freedom and liveliness are essential qualities of good work, but a disciplined control must come first.' This sentence might be from either of these two books which, from their titles, sound worlds apart; the one book being a part of the modern western revival of interest in the 'sweet Roman hand', the other an exposition of a pure and immemorial oriental art. The words are, in fact, the concluding ones in Miss Camp's excellent book, and it is the practice of beautiful lettering which is here the common discipline. For the style of Chinese brush drawing has its origins in the use of pictorial symbols, which are also the basis of Chinese writing.

As a further result of this common origin the brush has always been used in China for both writing and painting, and Confucius embraced both, under the name calligraphy, as one of the Six Arts. (Painting and drawing, it should be mentioned, are not distinct as in the West.) This use of the brush is, as Mr. Cheng-wu points out, unique, and has no Western parallel. The practice of calligraphy is therefore the best training for Chinese painting. 'The quality of *Pi*, brush, and *Mo*, ink, is highly esteemed in Chinese painting', and it is the discipline of calligraphy which helps to develop the feeling for these qualities.

There is a remarkable unity of style shown throughout the long history of Chinese painting. This is partly due to the particular basis of the painting, but it is the Chinese attitude of ancestor-worship and respect for elders which has preserved the continuity and kept the style so pure. There is also the continuity of Chinese philosophy, Taoist and Buddhist, which influences the Chinese view of Nature. 'One is a part of the universe and yet it dwells in one.' The Chinese artist expresses by his brush stroke his feeling of the strength of a bamboo stem, his feeling of the swiftness of a bird's flight. He strives to be in perfect harmony with the object being painted.

The poetic feeling and the historical understanding needed for so traditional a genre Mr. Cheng-wu communicates extremely well. But the very emphasis which he places on these abstracts, vital as they are, underlines the slight feeling of incongruity which one has on finding this book in a 'How to Do It' series. Can so subtle an art be transmitted to a Western doer? But the attempt was worth making. Some fascinating information is brought to light and the illustrations again and again give, literally by a stroke, some flash of insight into the essential form or rhythm of some part of Nature.

Unfortunately the illustrations are not well reproduced. They give an impression of uniform greyness. This is particularly unfortunate with such paintings, where so much depends on subtleties of tone and texture. The subjects are admittedly difficult to reproduce, the special Chinese papers commonly used being partly responsible for this. More is the pity that none of the illustrations is in colour.

One's character and personality are revealed in handwriting, says Mr. Cheng-wu.

The potentialities of handwriting are often underrated, and Mr. John Farleigh in his Foreword to Miss Camp's book goes so far as to say that it is 'a craft that contains as much beauty and can be as far-reaching in its effects as any of the arts'. Miss Camp's approach to this craft is methodical and well-digested, without being pedantic or cramping to individual style. The work is taken in careful steps, and one does not have to read the whole book in order to collect enough information on different essentials with which to make a start. This planning is no doubt the result of Miss Camp's nine years of teaching, and it is the more valuable in view of the number of books available written by enthusiasts without such experience, who therefore find it difficult to communicate their undoubted skill and knowledge.

'The best ink is a good Chinese stick', says Miss Camp. Thus the centuries of experience and wisdom of the East meet the present needs of the West. Mr. Farleigh's claims for handwriting may be justified in the words of the Chinese writer concerning calligraphy in the full Confucian sense: 'It is a sort of exercise and technique both physical and mental. It develops and forms style. Drawing is not only the study of nature, it is also for taking notes of inner feeling in response to nature, or recording thoughts and dreams of the invisible world derived from nature.'

MICHAEL OLIVER

THE BRITISH PAPER INDUSTRY, 1495–1860; A STUDY IN INDUSTRIAL GROWTH. *By D. C. Coleman. Oxford, Clarendon Press*, 1958. 55*s*

The first date in the title of this excellent book refers to a mill which made paper in Hertfordshire in the reign of Henry VII. It was not, however, till the later decades of Elizabeth that the British paper industry took root. John Spilman's mill at Dartford was the subject of poetic eulogies which recall the legends surrounding John Winchcombe's Tudor textile factory at Newbury. Although its size and grandeur were equally exaggerated, it provided a pattern for units of the industry which was to remain constant for the next two hundred years. The techniques of production made the factory system uneconomic for the textile industry until mechanization had been introduced. In the paper industry they made the concentration of labour necessary from the beginning and in consequence no domestic system developed.

In 1686 a group of paper makers of Huguenot background were incorporated as the 'Governor and Company of White Paper Makers in England'. Encouraged by the Privy Council but harried by Barillon, the French King's ambassador to James II, they seem to have been an active body for at least ten years, but they disappear from the records after 1698. This was the only attempt made by the state—apart from the granting of patents and monopolies—at what might be called internal regulation of the paper industry. The industry had developed too late for the guild structure to become established. Nevertheless, as the producer of a commodity which still streamed in from the great economic rival France, and as the user of a raw material, home produced rags, which were frequently exported to supply foreign needs, it found favour with mercantilist writers and secured from Parliament a rigorous protection against foreign competition.

In the eighteenth century, protected by a tariff but burdened with an excise, the British paper industry grew to supply the home market. Output rose fourfold between 1738 and 1800. This Society was concerned that the native industry should produce paper of the high grade needed for copper plate printing and match the quality of that made in France and Italy*, but for most purposes British paper had become equal to the best which could be secured from abroad. After it had received 'the impetus of the Industrial Revolution . . . this industry forged ahead of its continental rivals'.

*Dr. Coleman will be contributing an article on the Society and paper-making in the eighteenth century to the series *Studies in the Society's Archives*.

During the fluctuations in prices of the first decades of the nineteenth century, masters and men in the British paper industry were in frequent conflict. With the advantages of their unique skill and of a concentration of their labour within the unit of production, the journeymen paper makers were in a far better position to bargain with their masters than were either the unskilled operatives of the cotton mills or the woollen and worsted weavers working in their scattered homes. For the employer, labour troubles were a burden additional to the heavy excise and the fluctuations in trade. In the 1830s mechanization enabled them to employ a labour force of a different form. As a large scale employer of the young, the industry emerges from the inquiries of the Commissions of 1843 and 1865 with an extremely good record. There was of course a darker side, and the 'abominably dense atmosphere of heavy dust' which one witness described could have been found in many mills even where the hand process was continued.

Dr. Coleman ends his book at the abolition of tariffs and excise in 1861 and before the rise of the great modern industry based on wood pulp. To those who have been privileged to visit the mill at Maidstone where Whatman's beautiful 'Antiquarian' is still produced, the craftsmanship, inventiveness and high aesthetic quality of the older industry is no less remarkable. This industry has now found the historian it deserved.

D. G. C. A.

THE BEAUTY OF MODERN GLASS. *By R. Stennett-Wilson. London, The Studio,* 1958. 30*s* net

The clever editing of a collection of photographs seems the basis of Mr. R. Stennett-Wilson's book. He points out that the astonishing versatility of use to which glass is now put—from 'a delicate drinking vessel' to the inset landing lights on an airport runway—means he is telling us less than half the story, and only that part which concerns handmade domestic glass; but this is scope enough.

Glass is Mr. Stennett-Wilson's business and no writer could be in a better position for collecting information. He introduces each chapter with notes on the skills he is illustrating; he leads off with a complete description of the art of glass blowing, a description which I must admit, does little but bewilder one with a host of detail and technical language. One really must see for oneself! But how innocent is the underlying purpose of this book? Here is a random statement. 'There are now quite a number of individual engravers turning to glass as a medium . . . particularly in Great Britain, and it is hoped that their demand for good shapes to engrave will not always have to be met by factories abroad.' A backhanded hint indeed, and the very thin and elderly collection of British photographs which is sprinkled through pages liberally laced with Scandinavian, Dutch, American and even Japanese names, is an added pointer to at least one of Mr. Stennett-Wilson's preoccupations.

Some sections of the British glass industry still seem to linger in the shades of the nineteenth century and its vast output of 'crystal' and 'cut' glass. When avoiding this obvious pitfall, then their simple shapes can be pleasant, but even Mr. Stennett-Wilson's own designs are pedestrian, a masterpiece of understatement, not a positive affirmation of the imaginative and creative processes which make glass such a fascinating material. No, we must hand the palm still to the Swedes. Let us be grateful indeed that such perfection exists as comes from Orrefors and Erkenas, and for the gaiety and pattern spinning of the Venetians, still gay even if straining a little after novelty, after so many centuries of imaginative skill.

Mr. Stennett-Wilson hints at the possibilities of glass and the collector.

Undoubtedly here is a rich field for the collector to whom neither old Masters nor modern Tachism has an appeal, and what scope for another book!

SYLVIA POLLAK

TEACH YOURSELF STATISTICS. *By Richard Goodman. English Universities Press*, 1957. *7s 6d*

This is not the elementary introductory text which its title suggests. Elementary descriptive statistics is treated (too incompletely and briefly for the book to be of much value to the student in this respect), but essentially this is an introduction to mathematical statistics. Proofs use the differential and integral calculus, and occasionally even multidimensional geometry. The book is therefore relatively mature mathematically, but regrettably the same cannot be said of its statistical theory. The treatment of regression theory, for example, is out of date, being based on bivariate normal sampling theory rather than the simpler approach, based on fixed independent variates, which has been familiar for over 30 years. More seriously, the discussion of the problems of statistical inference is incomplete and, most statisticians would agree, 15 years out of date. The fundamental ideas of theoretical statistics have changed so much in the last generation that, to be acceptable, a new textbook must be based on a wide and deep knowledge of the literature. It is a fair reflection on this book that its final suggestions for further reading do not include two leading modern introductions to mathematical statistics, those of Hoel and of Mood, while including several older texts at the same level.

ALAN STUART

BEACON WRITING—*A Course in Italic. By Charlotte Stone and Alfred Fairbank. Books 1 and 2. London, Ginn*, 1958. *2s each*

Although there are still strong differences of opinion as to the best method of teaching handwriting to children, the opinion which holds that the italic hand is best is rapidly gaining ground. Handwriting is first and foremost a means of communication, and it may be argued that any handwriting which is swift and legible serves its purpose. But written letters have an abstract beauty of their own irrespective of the ideas they may convey or the emotions they may evoke when combined into words, and it is demonstrable that italic handwriting is not only legible but can be both speedy and beautiful.

Handwriting is also a craft; and a satisfactory script should not only gratify the reader by its clarity but delight the writer in the formation of its shapes. It should 'give satisfaction to those who write as well as those who read'.

Handwriting involves a basic rhythm composed of a series of movements of the hand and arm. The Beacon Writing Books aim at developing this rhythm in the child and to direct it into 'the traditional shapes which are the letter forms'. 'In copying Books 1 and 2 the child will experience the movements required for handwriting. He will learn to know not only what shapes he has to form, but the very movements that are necessary.'

These are well produced books and the appearance of the page reminds one of Marion Richardson's. Indeed, it might be said that these hand-books comprise a course in handwriting that begins with Marion Richardson and ends with Alfred Fairbank. Alfred Fairbank is himself the editor and calligrapher, which, in itself, is a guarantee of the Beacon Books' authority in the art and craft of italic handwriting.

JOHN R. BIGGS

SHORT NOTES ON OTHER BOOKS

FORM IN GOTHIC. *By Wilhelm Worringer. Authorized translation, edited with an Introduction by Sir Herbert Read. London, Tiranti,* 1957. *25s*

A new edition of what has become a classic document in the history of art appreciation. In his Foreword to the fourth edition, published in 1918, Professor Worringer described the work as 'a living portion of my past development', and so he presents it to a new generation of English readers.

THE MODERN ARCHITECTURAL MODEL. *By T. W. Hendrick, with a Foreword by Sir Hugh Casson. London, Architectural Press,* 1957. *16s net*

This handbook deals with architectural models of all scales sizes and types. Precise instructions are given on construction methods and techniques, and the proper uses of materials, both traditional and new, are fully described. Illustrated with diagrams and many photographs.

BRISTOL AS IT WAS 1914–1900. *By Reece Winstone. Bristol, Reece Winstone,* 1957. *9s 6d*

Mr. Winstone has skilfully assembled another 170 photographs to evoke a Bristol distant in time and mood. The result is particularly valuable as an architectural and social record. Captions throughout are thorough and detailed, and the standard of reproduction is as high as in the first of this series (see *Journal*, 27th September, 1957, p. 894).

ART AND SCHOLARSHIP. *By E. H. Gombrich. London, H. K. Lewis & Co. Ltd. (for University College),* 1957. *2s 6d*

The inaugural lecture of the Durning-Lawrence Professor of the History of Art at London University. Professor Gombrich sees the scholar as the active 'guardian of memories', who has an essential—and adventurous—part to play in the attempt to unravel the mysteries of style. His own literary style is a model.

FROM THE JOURNAL OF 1858

VOLUME VI. *15th October,* 1858

PLAN FOR GIVING ALARMS IN PASSENGER TRAINS, BY J. O'NEIL

[*Abstract of a communication made to the Mechanical Science Section of the British Association for the Advancement of Science at its 28th annual session in Leeds.*]

The invention consists of an iron bar extending under each carriage, and suspended on a pin a little from the centre, so as to make one end heavier than the other.

The heavy end is securely held in a bridle, by a hanging latch at the end of the carriage.

The light end also passes through a bridle at the other end, and has a tongue which draws out from the bar, and reaches under the latch fixed on the next carriage.

By disengaging any of the latches, the heavy end falls; and the light end, in rising, throws up the next latch, and so on to the guard's van, where it rings an alarum.

A chain or wire, fixed to the latch and brought into the carriage, gives each passenger, in the event of danger, the means of giving a signal to the guard; and a duplicate set of bars, on the other side of the carriage, enables him instantly to communicate with the driver if necessary.

The end of each tongue has a rising point, rivetted loose, so that the porter, when coupling the carriages, could put it in position for disengaging the latch, in case the carriages should become detached by the breaking of the coupling chains.

As the bars are not connected, any number of carriages can be taken off or put on a station, by merely turning the loose point on the end of the tongue up or down.

LIBRARY ADDITIONS

Fellows and Associates are reminded that they may borrow up to five books at a time from the Library and retain them for a month. Members living outside London may borrow books by post. Books sent by post are despatched at the cost of the Society and returned at the cost of the borrower. Books marked with an asterisk are part of the reference library, and not normally available for loan.

INDUSTRIAL AND COMMERCIAL ART AND DESIGN

BALFOUR, HENRY—The evolution of decorative art, an essay upon its origin and development as illustrated by the art of modern races of mankind. *London, Percival & Co.*, 1893.

THE DICTIONARY OF NEEDLEWORK; an encyclopedia of artistic, plain, and fancy needlework . . . *London, L. Upcott Gill*, 1882.

FISHER, ALEXANDER—The art of enamelling upon metal, with a short appendix concerning miniature painting on enamel. *London, The Studio*, 1906. Bequeathed by F. H. Andrews.

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